

Miami-Dade
Water and Sewer Department

Comprehensive Lateral Investigation Program (CLIP)

Preliminary Draft Report

May 2006







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MIAMI-DADE COUNTY WATER AND SEWER DEPARTMENT

COMPREHENSIVE LATERAL INVESTIGATION PROGRAM

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Foreword

Little attention was paid to collection system infiltration/inflow issues prior to the promulgation of the Clean Water Act in the early 1970's. Sewer line joint materials were not as effective as they are today and sewer system overflow structures were routinely included in collection system designs. I/I issues were initially addressed with the emergence of the EPA Grant Program where sewer system evaluations were a requirement for grant funding. An emphasis on the elimination of sewer system overflows concurrent with reduced treatment plant funding programs during the past 20 years has created a renewed interest in collection system maintenance issues.

The emergence of new SSES procedures and the development of trenchless technologies has made mainline sewer I/I programs more cost effective. Lateral repair programs, however, continue to be the last portion of the collection system to be addressed. The wastewater industry must now develop procedures to make lateral repair programs more cost effective.

The Miami-Dade Water and Sewer Department (Department) has decreased treatment plant average daily flows over the last 10 years with an effective I/I program. Peak flows, however, continue to exceed treatment capacity during major storm events. Since the laterals were the only collection system component not addressed under the I/I program, a pilot lateral program was developed to evaluate its effectiveness at reducing rainfall dependent infiltration/inflow (RDII) flows.

This report describes the lateral pilot program known as the Comprehensive Lateral Investigation Program (CLIP). The Program can provide a model to assist the Department's volume sewer customers and other utilities to evaluate similar programs.



Acknowledgement

The information presented in this report reflects the joint efforts of both the Department staff and the members of the Hazen and Sawyer CLIP Team.

Mr. Rodney Lovett, Department Project Manager, provided valuable guidance throughout the Program. Mr. Larry Decker and Mr. Ini Roberts coordinated Department field activities and provided collection system data support. Mr. James Saren and Mr. Juan Bedoya worked closely with the CLIP staff and performed field investigation, lateral testing and lateral repair functions.

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Finally, the following CLIP Team subconsulting engineering firms are gratefully acknowledged for their contribution to the Program. These include:

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MIAMI-DADE COUNTY WATER AND SEWER DEPARTMENT

COMPREHENSIVE LATERAL INVESTIGATION PROGRAM



Section 1.0 Executive Summary

1.1 Background

The Miami-Dade Water and Sewer Department (Department) has conducted an extensive wastewater collection system infiltration/inflow (I/I) program since 1994, to reduce extraneous groundwater and rainwater flows entering the system. Total system flows to the treatment facilities were 325 mgd on an annual average daily flow basis and it was estimated that approximately 40 to 50 percent of the system flows were I/I.

The I/I Program consisted of inspecting manholes, video TV and smoke testing 100 percent of the system and performing repairs on all sewer line defects. The entire collection system was completed under the Program by _____ and a total of 32,194 defects were identified and resolved. Department forces are continuing to evaluate the system on a ten year cycle (10 percent per year).

The I/I Program has been highly successful. The actual flows to the treatment facilities have decreased over the 10 year period since 1995 and it is estimated that approximately 130 mgd of average daily flow has been eliminated from the collection system.

Although the average daily flow reduction is substantial, peak flow during rain events or rainfall dependent infiltration/inflow (RDII) flows continue to be excessive with estimated peak flows exceeding four times the average daily flows. At the end of the initial program, it was concluded that the Program was effective at addressing sewer line leaks below the groundwater table (infiltration) which could be detected by manhole inspection and video TV, but leaks above the normal groundwater table (RDII) were not being properly addressed with the smoke test program. The only part of the system not being addressed under the Program was the laterals which were above the groundwater table.

A lateral pilot program was initialed by the Department in 1999 to address RDII flows and determine the effectiveness of performing lateral inspections. Under the program, three collection basins were selected and 100 percent of the laterals were air pressure tested and identified lateral defects were repaired. Comparing system flows before and after rainfall events indicated that the program was successful.

1.2 CLIP Proposal

As a result of the Initial Lateral Pilot Program, the Department proposed to conduct a more extensive program identified as the Comprehensive Lateral Investigation Program (CLIP) to address the RDII issue. The Program was approved by EPA on January 2002

and federal line item matching funds were obtained to partially offset Program costs, since the Program resulted from a Consent Decree requirement which was not anticipated at the time.

CLIP tasks included identifying 30 typical system collection basins, performing air pressure tests on each lateral within the basin and performing repairs on all laterals which failed the pressure test. RDII flows into the basins during peak flow storm events would be quantified before and after the repairs were made to determine the effectiveness of the Program. Program costs would also be monitored and cost effective analyses of the CLIP at reducing system flows would be developed. These costs would then be compared to the cost of other RDII reduction alternatives such as modifying pump station operations to reduce RDII flows and/or increasing the system-wide transmission/treatment capacity to process the RDII flows.

1.2.1 Purpose

One of the grant funding requirements was for the Department to issue a CLIP report which describes the program in detail. The purpose of the CLIP was to allow the Department to quantify the potential impact of lateral rehabilitation on the overall peak flow facility requirements. It will provide the information necessary to estimate RDII reductions, quantify costs and determine the cost effectiveness of the Program. In addition, the CLIP Report will provide useful information to assist other utilities in addressing similar RDII issues. The preliminary program findings indicated that lateral repairs will reduce RDII flows at the source, and may well make a cost effective contribution to the overall Department peak flow reduction effort. The Program could reduce the estimated \$1.6 billion cost required for peak flow transmission and treatment facility improvements.

The purpose of this report is to define the CLIP and provide data on the cost and effectiveness of a system-wide CLIP. This report is intended to satisfy the requirements of the EPA Grant Funding Program.

1.3 Basin Selection

The Department owns and operates approximately 960 sewage pumping stations throughout Miami-Dade County. Approximately 500 of these stations exhibit excess RDII flows during major storm events. The following data were collected on the 500 basins.

- RDII Signature
- Night Flow Quantity
- Land Use
- Sewer Line Repair Status
- Last SSES Data

- Sewer Component Materials
- Number of Laterals
- Location within the County
- Proximity to Surface Water
- Future Development Potential
- Age of System

The system RDII data indicated that the 500 basins contributed over _____ mgd of flow to the treatment facilities during major rain events. An analyses of the 500 basins indicated that _____ percent had clay pipe materials and _____ percent had PVC pipe materials. A total of 52 of the 500 basins, which represented typical stations, were selected for the CLIP. The following Program basin selection criteria were used to facilitate the evaluation and reduce CLIP costs:

- Less than 15,000 feet of sewers
- Constant speed pumps
- Terminal basin with no other basin contributing flows
- Discharge to gravity systems to facilitate flow calculations

Table 1.1, on the next page, lists each of the 52 CLIP basins and their characteristics.

Table 1.1
Basin Characteristics (52 Basins)

Basin	Footage	Location	City of Miami	District	Wetwell Field Protection Area	Age	Main Line Material	No of Laterals	No of Stacks	Zoning	Peak Flow Factor 2001	RDII Signa- ture	Comments Selection Report
35	4,367	NW	Yes	3	No	1954		98	2	Commercial	1.4	No	
47	13,648	NW	Yes	3	No			453	193	Single Family / Multi-Family / Commercial		No	
58	4,767	CE	No	3	No	1946		95	5	Single Family	2.4	No	Tidal Influ- ence
70	507	CW	Yes	5	No			16	3	Multi-Family / Commercial	6	No	
80	20,414	CW	Yes	5	No			379	184	Multi-Family / Government	3	No	
82	4,906	CW	Yes	5	No			194	58	Single Family / Multi-Family	7.5	No	
118	4,314	NW	No	12	No	1972		33	4	Commercial	1.8	No	
126	1,895	CW	No	12	No	1986		23	4	Multi-Family / Commercial	2.7	No	Sweetwater Area
154	3,583	CW	No	12	No	1981		28	4	Commercial	2.8	No	
162	5,779	CW	No	12	No	1995		41	1	Commercial	6.4	No	
194	10,570	NW	No	12	Yes	1963		59	27	Commercial	8.6	No	
195	8,650	NW	No	12	Yes	1968		61	5	Commercial	2.4	No	
336	3,572	NW	No	13	No	1983		26	0	Commercial	11.7	No	
350	19,167	NW	No	1	No	1979		535	60	Single Family / Multi-Family	27	No	
355	16,101	NW	No	13	No	1960		249	27	Single Family	4.9	No	
358	1,614	NW	No	1	No	1957		67	1	Single Family	7.3	No	On edge of canal

Table 1.1
Basin Characteristics (52 Basins)

					Wetwell Field		ar actoristics				Peak Flow	RDII	Comments
Basin	Footage	Location	City of Miami	District	Protection Area	Age	Main Line Material	No of Laterals	No of Stacks	Zoning	Factor 2001	Signa- ture	Selection Report
364	16,101	NW	No	1	No	1971		357	32	Single Family	3.6	No	
378	13,317	NW	No	1	No	1955		237	32	Single Family	3.4	No	
380	8,453	NW	No	13	No	1968		192	5	Single Family	4	No	
405	1,354	NW	No	13	No	1967		21	2	Multi-Family	2.7	No	
410	8,907	NW	No	13	No	1980		109	11	Single Family / Multi-Family	6.3	No	
479	19,025	NW	No	13	No	1991		445	22	Multi-Family	3.5	No	
484	37,685	NW	No	13	No			915	29			No	
509	10,595	CW	No	10	Yes	1989		223	21	Multi-Family	3.5	No	
524	8,562	CW	No	10	Yes	1983		120	6	Single Family / Multi-Family / Commercial	2.9	No	
525	20,488	CW	No	10	Yes			628	1			No	
564	7,143	SW	No	9	No	1987		183	98	Single Family	5.4	No	On edge of canal
577	8,159	SE	No	8	No	1989		280	26	Multi-Family	3.1	No	
603	12,482	SE	No	8	No	1970		56	27	Commercial	2.7	No	
608	4,603	SW	No	9	No	1970		91	14	Single Family / Multi-Family / Commercial	5.8	No	
615	11,273	CW	No	10	Yes	1956		281	145	Single Family		No	
681	6,750	SW	No	9	No	1985		41	6	Agricultural	8.8	No	
708	11,816	SE	No	8	No	1958		217	71	Single Family	5.7	No	
722	17,725	SW	No	9	No	1972		52	4	Single Family	4	No	
729	5,044	SW	No	8	No	1970		71	37	Single Family	6.2	No	

Table 1.1
Basin Characteristics (52 Basins)

								1			Dools		
					Wetwell						Peak	DD!!	0
			City of		Field		Main Line	Noof	No of		Flow	RDII	Comments
Basin	Factors	Location	City of Miami	District	Protection	A ~ ~	Main Line	No of	No of	Zonina	Factor 2001	Signa-	Selection
	Footage			District	Area	Age	Material	Laterals	Stacks	Zoning		ture	Report
753	7,175	CW	No	10	Yes	1963		111	48	Single Family	4.8	No	
763	5,594	CW	No	7	Yes	1972		61	5	Multi-Family	1.66	No	
790	1,554	CW	No	7	No	1961		12	1	Commercial	4.8	No	
802	5,335	CW	No	8	Yes	1961		118	7	Multi-Family	5.9	No	
803	15,300	CW	No	8	No	1960		411	117	Single Family / Multi-Family / Commercial	2.6	No	
813	1,579	CW	No	10	No	1958		12	7	Single Family	5.4	No	
823	9,930	CW	No	8	Yes	1968		154	22	Single Family	3.4	No	
828	4,665	CW	No	8	Yes	1978		80	77	Single Family	3.1	No	
829	1,527	CW	No	8	Yes	1968		44	1	Multi-Family	3.4	No	
851	10,414	CW	No	10	Yes	1977		258	19	Multi-Family	1.8	No	
880	14,253	CW	No	8	Yes	1978		270	53	Single Family	2.7	No	Between a canal and lake
885	6,581	CW	No	8	Yes	1979		101	18	Single Family	2.7	No	
1004	10,340	SE	No	8	Yes	1953		224	39	Single Family / Multi-Family		No	
1031	4,725	SW	No	9	No	1989		106	41	Single Family	9.2	No	
1032	8,075	SE	No	9	No	1989		193	48	Single Family	3	No	
1033	9,594	SE	No	8	No	1990		304	43	Single Family	3.3	No	
1063	10,594	SE	No	8	No	1972		155	36	Single Family	4	No	

1.4 Public Outreach Program

It was determined that the Department could not test the private side of the laterals without the property owners written permission. A total of 9,202 letters were issued to the CLIP property owners requesting permission to test their lateral. Table 1.2 shows the results of the program.

Table 1.2
Public Outreach Program Results
May 26, 2006

May 20, 2000									
Description	Quantity	Percent							
Letters Sent	9,202	100.00%							
"Yes" Responses	6,301	68.47%							
Letters	6,197								
Field Responses	104								
"No" Responses	229	2.49%							
Letters	148								
Field Responses	81								
Total Responses	6,530	70.96%							
Pending Responses	2,672	29.04%							

The Public Outreach Program was very successful with a 70 percent response rate. Approximately 96 percent or 6,301 of the 6,530 respondents allowed the Department on their property.

1.5 Inspection Program

Each lateral in the Program was first air tested to determine its integrity. Private side laterals without owner's permission were not tested. Laterals from the main sewer in the street to the No. 1 Cleanout at the house were first tested. If the line passed the 3 to 5 psi air test, it was considered tight or defect free. If the line failed the test, it was divided into two segments: the public side from the main sewer to Cleanout No. 2 at the property line and the private side from Cleanout No. 2 to Cleanout No. 1 at the house. Each of the line segments were then air tested to determine its integrity.

Table 1.3 shows the results of the air test program.

Table 1.3 Air Test Program Results

Sewer Line Tested		Public		Private					
	Pass	Fail	CND	Pass	Fail	CND	N/A		
9,292									
Percent									
CND – could not do bec	ause of fie	ld conditi	ons						
N/A - no authorization to	enter pro	perty							

A total of	public laterals or	percent passed the pressure test and a
total of	or	percent of the private laterals passed the test.

Public side laterals which failed the pressure test were televised if they were over six feet deep. It was considered most economical to dig and replace shallow laterals and no TV would be required. Private side laterals which failed were televised and smoke tested to prove to the property owner that they were defective.

1.6 Repair Program

The inspection field data was reviewed and repair calls were made. Unit prices for various repair technologies were obtained through a competitive bidding procedure. Point repair, dig and replace and cured-in-place technologies were specified. Table 1.4 lists various repairs used in the Program.

A total of	lateral repairs	were	completed	and	each	line	was	subsequ	uently
pressure tested to confi	irm the integrit	y of the	e repair.						

Table 1.4 Program Repairs – May 23, 2006

	1	1			F	'rograr	n Repai			106						1
			Repair Technology Excavated Point Repair/ CIP Main Line /													
						eplacement			Cured-In-Place Liner			Lateral Connection Repair				
				MDWASI		Contractor - Metro										
			MIDWAGD		Contractor - Well O			Lillei			Керан					
					_			_			_			_		
			7		Completed	ਰ		ompleted	ਰ		Completed	ਰ		ompleted		
			ldentified	-	<u>ā</u>	ldentified	-	<u>ē</u>	% Identified	-	<u></u>	ldentified	-	<u>e</u>	Donoiro	
	Current	Cannot	Ę	ě	d u	≒	ě	du	٦ŧ	ě	du	≒	ě	du	Repairs Pending	
Basin	Repairs	Do	<u>e</u>	penss 138	ō	<u> </u>	penss	ō	<u> </u>	lssued	ō	ᅙ	Issued			Status
47	224	В	138	139	105		<u> </u>	ပ	96	<u> </u>	0		<u> </u>	၁	0	Ongoing
70	10		10	10	8				00						0	Ongoing
80	27		27	27	18										0	Ongoing
82	15		15	15	15										0	Completed
194	30		30	30	13				5						0	Ongoing
195	13		8	30											0	To be issued
509	35		35	35	23										0	Ongoing
524	86		- 00	- 00											86	Under review
525	23		14	13	1				9						0	Ongoing
564	12		12	12	12										0	Completed
603	6		6	6											0	Ongoing
608	34		34	34	18										0	Ongoing
681	11		11	11	11										0	Completed
708	100		100	100	20										0	Ongoing
722	19		12	12					7						0	Ongoing
729	4		4	4											0	Ongoing
753	50					35			15						0	To be issued
813	19		19	19											0	Ongoing
823	89		89	89	74										0	Ongoing
828	0														0	N/A
851	23		23	23	23										0	Completed
880	6		6	6											0	Ongoing
1004	80														80	Insp. Ongoing
1031	6		6	6	6										0	Completed
1033	26		26	26	22										0	Ongoing
1063	33		33	33	33										0	Completed
26	981		658	649	389	35			122						166	

1.7 Analysis

Hydrographs or graphs of basin flows over time were developed for each CLIP basin. Basin flows during a two year storm event (4.5 inches in 24 hours) were quantified for storm events before and after the lateral repairs were made. Table 1.5 shows the results of the analysis for each basin. In general, the data indicate the RDII in the CLIP basins was reduced by ______ percent. Based on the 500 RDII basins, a similar flow in each of these basins could reduce the RDII flow by _____ (____ percent of ____ mgd).

Table 1.5 Basin Analysis

CLIP basin characteristics were evaluated to determine if certain basin characteristics could contribute to the success of the CLIP program. Table 1.6 lists the CLIP stations by percentage RDII reduction and compares their characteristics.

Table 1.6 Basin RDII Reduction

1.8 Program Costs

The cost of each phase of the CLIP was developed. Table 1.7 lists the Program component and its total cost.

Table 1.7 Program Components and Cost

The cost of the CLIP was \$	This resulted in a unit cost of \$ per m	ıgd
of RDII removed which compares fav	orably with the cost of transmission and treatme	ent
facilities which is estimated at \$	per mgd. It should also be noted that	the
cost of treatment may well increase we moval rates for high level disinfection	ith future regulations which may require higher or nitrogen reduction criteria.	re-
9	g RDII flows per lateral and basins with the high	

The 500 high RDII basins have varying RDII flows per lateral and basins with the highest RDII concentrations would be most cost effective to repair. Figure 1-1 is a graph of the RDII per lateral in each of the basins. A 20 year payback period (6 percent cost of money) line based on treatment and transmission cost, is shown in the graph. Basins above the line would be cost effective with a pay back period less than 20 years.

The graph indicates that, based on the 20 year pay back period, it would be cost effective to repair _____ of the basins.

1.9 Recommendations

Two ongoing Programs will impact the Department's Peak Flow Master Plan: The CLIP and the <u>Pump Station Optimization Program (PSOP)</u>. It has been demonstrated that the PSOP is a low cost capital program that greatly reduces RDII flows during two-year storm events.

The following procedure is recommended to reduce RDII flows in the collection system:

- 1. The PSOP recommendations are adopted and each pump station be operated under the proposed criteria.
- 2. Review system operations during a 2-year storm event to identify basins with excessive RDII.
- Complete a lateral improvement program on the high RDII basins with a 20-year payback period giving priority to the basins with highest RDII concentration per lateral.
- 4. Continue to implement a reduced lateral improvement program at a maintenance level as part of the Departments ongoing I/I Program.

The recommended four-step program should greatly reduce both RDII flows and system overflows with the lowest capital and O&M expenditure.



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Section 2.0 Introduction

2.1 Background

The Miami-Dade Water and Sewer Department (Department) has been engaged in an extensive sanitary sewer system evaluation and rehabilitation program since 1994 in an effort to reduce collection system infiltration/inflow (I/I). Under the I/I Program, the entire sanitary sewer collection system, which represents approximately 12.9 million feet of gravity sewer lines and 58,000 manholes was evaluated by July, 1997. The Program sewer evaluation consisted of cleaning and televising 100 percent of the gravity lines, the visual inspection of each manhole and the smoke testing of the entire system to identify sewer defects. A total of 32,194 defects were identified and repaired. Since the initial program, the Department has continued to monitor the collection system and repair defects on a ten year cycle (10 percent of the system per year).

As indicated in Figure 2-1, the I/I Program has been highly successful with system flows to the regional treatment facilities reduced by approximately 130 mgd. Although the system-wide infiltration was greatly reduced, rainfall dependent infiltration/inflow (RDII) and improvements to the transmission system have continued to increase the peak flows to the treatment facilities during heavy rainfall events. It is estimated that approximately 500 of the 960 pump stations continue to exhibit a RDII signature. Since the mainline sewer components were fully investigated and laterals from the main sewer to the house (house lateral) have only been evaluated in close proximity to the mainline sewer, the sewer house laterals have been identified as the only system component not fully investigated.

The house laterals above the normal water table were, therefore, considered the source of the RDII. The Department initiated a lateral pilot program (Initial Lateral Pilot Program) in 1999, to determine if house laterals could be the cause of the RDII and to quantify the cost and effectiveness of a lateral evaluation and repair program.

2.2 Initial Lateral Pilot Program

Three collection basins were selected for the Initial Lateral Pilot Program. Although all main sewers were repaired under the initial I/I Program, the program basin main sewers were re-televised and smoke tested and all manholes were again visually inspected for defects. This ensured that the collection system components other than the laterals were not sources of RDII. The identified repairs were completed and the manholes were sealed to reduce system inflow.

Figure 2-1 I/I Program Results

2.0 Introduction April 2006

After a significant rain event, rainfall dependent infiltration/inflow hydrographs were obtained for the "before" repairs baseline flow signatures. Each basin lateral, both public and private sides, were then air pressure tested for leaks and the defects were identified and repaired. Post repair hydrographs indicated that the lateral repairs were effective and the basin RDII signatures were reduced after lateral repairs were made.

2.3 CLIP

As a result of the initial pilot program, the Department decided to expand the program to include thirty (30) additional basins. The new Comprehensive Lateral Investigation Program (CLIP), once again, evaluated the effectiveness of the lateral repairs to determine the feasibility of expanding the Program to the remaining 500 basins which exhibited RDII signatures.

Metropolitan Dade County entered into a Consent Decree with the US EPA in June 1994, to address outstanding wastewater issues. Paragraph 17 of the Consent Decree required the Department to develop a Peak Flow Management Study (PFMS) to characterize peak flows for each pump station and evaluate each station's ability to manage the peak flows. The Consent Degree then required the Department to address each station's ability to transmit the required flows. The Department's Wastewater Master Plan estimated that approximately \$1.6 billion in capital improvements would be required for transmission and treatment facilities to satisfy existing system peak flow conditions.

Although not specifically required by the Consent Decree, the Department formally requested that the CLIP results be incorporated in the Study in October 2001, since it may cost effectively reduce peak flows and be a key element in the overall peak flow management scheme. The Comprehensive Lateral Investigation Program Action Plan, in Appendix A, was submitted in support of the request. The EPA approved the CLIP in January 2002 and a time extension was granted for the Study in order to incorporate the results of the CLIP. The Department applied for EPA grant funding for the Program and received \$1,300,000 in partial grant funding for the CLIP and other programs not anticipated in the Consent Decree to collect data for the Peak Flow Management study.

2.3.1 Program Purpose

The CLIP has four basic purposes. These are to:

- 1. Evaluate Program Effectiveness
- 2. Assist in satisfying Consent Decree Requirements
- 3. Satisfy EPA Funding Requirements
- 4. Provide a Model for Other Utilities

Each of these purposes is described_below:

2.0 Introduction April 2006

1. Evaluate Program Effectiveness

The main purpose of the CLIP is to evaluate the feasibility of developing a lateral inspection and repair program to reduce collection system RDII flows. Data obtained under the Program would allow the Department to evaluate the cost effectiveness of reducing RDII flows. The Program cost per gallon would then be compared to other alternative solutions for addressing peak flows.

2. Assist in Satisfying Consent Decree Requirements

The Department entered into an EPA Consent Decree in June 1994 to resolve several wastewater system issues. Under the Consent Decree the Department was required to develop a Peak Flow Management Study (PFMS) to address peak flow issues. Although it was not required by the Consent Decree, the CLIP became an element of the PFMS since it may be cost effective at reducing peak flows. The PFMS is due to be completed by February 2008. Therefore, the CLIP must be completed before the February date.

3. Satisfy EPA Funding Requirements

The Department received approval for federal line item funding for the CLIP on October 4, 1998. The funding, administrated by EPA, consisted of \$1,300,000 in matching funds to defray CLIP and other peak flow program costs. One of the requirements of the EPA funding was that a CLIP report be issued to describe the Program and its effectiveness at reducing peak flows. This report is intended to satisfy the funding requirement.

4. Provide a Model for Other Utilities

An additional purpose of the Program is to provide information to other utilities with similar peak flow issues to help facilitate their programs. Program procedures and findings are detailed to assist in transferring lessons learned to other utilities. Although the Department's specific conditions are unique, (high groundwater levels where sewers are continuously submerged in the groundwater table and approximately 60 inches of rainfall per year), many of the Program findings can be directly applied to other utility applications. This report is intended to assist the utilities in developing similar Programs.

2.0 Introduction April 2006

2.4 Report Outline

This report addresses CLIP issues in accordance with the requirements of the EPA grant funding program. The contents of each Section are outlined below:

- Section 2 provides background information, including the development of the Initial Lateral Pilot Program and the EPA Grant Program, and reviews the report contents.
- Section 3 describes the CLIP team organization, and the team members and their responsibilities.
- Section 4 outlines the various Program tasks including basin selection, protocols and lateral investigation and repair procedures. The Public Outreach, Road Moratorium and Work Force Area programs are also described.
- Section 5 describes various tools used in the Program. These include the development of hydrographs, the work order system and the database management system.
- Section 6 outlines administrative tasks associated with the Project. These include a listing of responsibilities for the individual Team members, and the document control, budget and schedule control and Program status reporting systems.
- Section 7 describes the Program analysis methods. It describes the overall program results including percentage of laterals requiring repair, quantity and types of repairs required and the effectiveness of the Program.
- Section 8 summarizes the overall Program costs and determines the cost per lateral repair for each basin type.
- Section 9 uses the data obtained for each pilot basin, applies it to the remaining 500 basins with RDII signatures and determines the overall cost effectiveness of the Program. Cost effective portions of the Program are identified and a recommended Program is defined for the remainder of the collection basins.



Section 3.0 **Program Organization**

The Hazen and Sawyer Team was selected to provide program management services for the CLIP pilot program. As described in the Project scope, the Team was responsible for "managing the Program and the budget of \$10 million for the inspection of 3,350 laterals annually resulting in repairs of approximately 1,600 laterals; writing specifications in accordance with established protocol for lateral investigations and repairs; project tracking, scheduling contractor's work; maintaining a database for the information obtained which will be used later in the Peak Flow Model; ensuring compliance with local state and federal regulations and planning and preparing written progress reports including the final report".

3.1 Lateral Pilot Team

Figure 3-1 shows the organization chart for the Project. Hazen and Sawyer, P.C. was the lead firm responsible for the overall project management including construction management services. Earth Tech Consulting, Inc. provided office management and inspection services, Cordozo Engineering provided database management services, San Martin Associates provided administrative and scheduling services and Civil CADD Engineering, Inc., provided inspection services.

Key employees (Project Manager, Deputy Project Manager, Data Management Specialist) spent one third to one half of their time on the program while other office staff (Administration/Scheduling Manager and two administrative full time staff members) were full time employees. The inspection staff (Construction Manager and Inspectors) spent 100 percent of their time on the Program to supervise the inspection and repair operations. Six inspectors were required for the Project: Two for the lateral investigation work and four for the lateral repair work.

3.2 Program Schedule

The program management contract anticipated an expenditure of \$2,500,000 over a three year Program period. However, the Consent Decree indirectly required the Program final report be issued by February 2006. Therefore, the Program schedule was initially reduced to a twenty five month period.

The initial schedule anticipated the repairs would be completed by December 2005, and a draft report issued within six weeks. Comments would be received and resolved before the February 2006 date.

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COUNTY

As the Program progressed it became apparent that additional time would be required and the Program would have to be extended because critical rain events did not occur as anticipated to determine the effectiveness of the repairs. The Department requested a one year time extension on March 2005 and EPA approval for the extension was received on ______. This required that the field work be completed by December 2006 and a draft report issued and comments received and resolved before the February 2007 deadline.

A Program goal of completing the repairs on at least 30 basins by June 2006 was set to allow time for an "after repair" rain event to take place.

3.3 Project Office

The Project Control Center was established at the Hazen and Sawyer Coral Gables office at 900 Ponce De Leon Boulevard. The office receptionist provided part time receptionist and secretarial duties and office space for four full time employees was provided. Space was also provided for part-time employees and inspectors who reported to the office as required.

3.4 Program Task Assignments

Project staff were assigned to either office or field tasks. The following tasks were assigned to each staff member. Section 4 gives a detailed description of the major tasks.

3.4.1 Project Manager

- Overall program responsibility
- Overall coordination of engineering and construction activities
- Coordinate client interface and sub consultant activities
- Provide program overview
- Provide general office administrative management support
- Ensure proper utilization of resources
- Develop, implement and update Program Management Plan including scheduling procedures and analysis, cost controls, administrative reporting and quality control
- Oversee quarterly and yearly cash flow projections
- Oversee reporting to EPA on Consent Decree requirements
- Oversee final program report
- Attend monthly Peak Flow TAC meetings
- Attend weekly construction meetings

3.4.2 Deputy PM/Administration /Engineering

- Coordinate the administration/engineering staff
- Review procedures and protocols
- Review and release work issuance reports
- Review Contractors' invoices
- Set up and review document control procedures
- Review basin selection process
- Review databases
- Review hydrographs
- Coordinate Public Outreach Program
- Attend meetings such as Weekly Construction Meeting, Monthly TAC Meeting, etc.
- Review Road Moratorium/Conflict Verifications
- Prepare and review CLIP Monthly Status Report, monthly TAC meeting minutes
- Assist Program Manager with planning, implementing and updating management plan
- Assist Program Manager in monitoring staff productivity and staffing levels
- Prepare specialized reports to assist MDWASD in presentations

3.4.3 QA/QC

- Provide QA / QC support
- Provide design, analysis and rehabilitation construction assistance
- Review program reports

3.4.4 Administration/Scheduling

- Preparation and update of CLIP Schedule
- Preparation of work order issuances for MWASD's crew and contractor
- Update of database with completed work orders
- Conflict verification of ongoing roadway construction projects by other agencies (FDOT, DERM, FEMA / DORM, CICC, and PWD)
- Update database with outreach program response
- Engineering support (Reports, etc.)
- Clip meetings
 - Attend Monthly TAC meetings, write agenda and minutes
 - Attend CLIP Construction meetings, write agenda and minutes
 - Attend miscellaneous meetings with the client

3.4.5 Data Management

Property Owners database

- Obtain necessary data to send letters requesting access to perform the inspections on their property
- Develop necessary reports for the outreach program analysis
- Keep the Property Owners database updated with new responses received by mail or from the field

Basins Database

- Keep the basins database updated
- Select basins for inspection/repair

CLIP database

- Combine data received from Department's database to select the data related to the CLIP program only
- Review and analysis of TV log database
- Develop forms to upload data into the database
- Build queries and reports for the inspection analysis
- Build queries and reports to follow-up field work
- Build queries and reports for program costs and analysis

CLIP meetings

- Attend Monthly TAC meetings
- Attend to CLIP Construction meetings
- Attend miscellaneous meetings with the client

Hydrographs

- Select and monitor the most appropriate rain gauge for each basin
- Select and monitor the most appropriate groundwater level gauge for each basin
- Collect necessary data to build hydrographs to study the basins selected for the CLIP
- Update hydrographs monthly:
- Year-to-data hydrographs
- 2001-to-date hydrographs
- Pre/Post mainline repair overlay graphs

3.4.6 Document Control/Administration

Review, track, stamp, copy, file, and distribute all incoming and outgoing documents, including mail, faxes, hand delivered, e-mail, etc.

- Prepare and execute invoices and authorizations
- Download pictures from field and incorporate them into their corresponding Work
 Order
- Organize Work Order into binders
- Answer phone calls regarding CLIP
- Log all documents relating to engineering and construction activities
- Log in and file all Program videos and photographs
- Retrieve documents as requested
- Provide copies of filed documents as necessary
- Performs work processing tasks
- Coordinate meetings

3.4.7 Construction Manager

- Coordinate construction activities
- Review construction group policies and procedures
- Recommend repair calls to engineering
- Coordinate with engineering group assignment of work to contractors
- Review monthly and weekly construction status reports
- Monitor documentation of completed construction work
- Review all contractors' invoices, including pictures, Work Orders, etc.

3.4.8 Inspector

- Observe inspection and repair work
- Ensure that all work performed conforms to contract specifications
- Maintain documentation as required by Program policy
- Take and maintain field photographs
- Sign-off on construction work
- Recommend field changes to Construction Manager



Section 4.0 Program Tasks

A number of programs were developed in order to administrate the CLIP. The following is a description of some of the major programs.

4.1 Basin Selection

The Department operates and maintains approximately 960 sewage pump stations which serve Miami-Dade County, Florida. The purpose of the CLIP was to identify approximately 30 collection basins which exhibited rainfall dependent infiltration/inflow signatures, to identify complete lateral repairs within each basin and to determine the associated cost and effectiveness of the repair Program. The basin selection task consisted of identifying 30 collection basins with excessive RDII which represented a cross-section of the County collection system. The consulting firm of Montgomery Watson Harza performed the basin selection analysis. Appendix B contains the MWH report.

Flow data for the stations were collected for a September 2001 storm event which approximated a 2-year storm event (4.5 inches of rain within 24 hours). The stations were categorized according to stations having RDII signatures, stations with little or no RDII signature and stations with insufficient SCADA data to determine the RDII signature. The data from an October 2001 storm event was also used to classify the stations. Approximately 500 stations were considered RDII stations.

The basins were then ordered according to highest RDII signatures and the high RDII stations were ordered by the size of the collection system. High RDII stations with under 15,000 feet of collection system sewers were selected for the Program in order to reduce Program repair costs. The selection criteria also included terminal basins (non-cascading systems) without other basin flows pumping to the system, and constant speed pump stations discharging to gravity sewers to facilitate flow calculations. The following data were collected for each selected basin:

- RDII Signature
- Night Flow Quantity
- Land Use
- Sewer Line Repair Status
- Last SSES Data
- Sewer Component Materials
- Number of Laterals
- Location in County

4.0 Program Tasks April 2006

- Proximity to Surface Water
- Future Development Potential
- Age of System

Although the Program initially evaluated laterals in 30 basins, a total of 52 basins were selected since some basins may not exhibit RDII signatures after the mainline repairs were completed. Typical basins, along with selective data, are listed on the next page in Table 4.1.

Because of the ongoing I/I Program, the system data was once again evaluated during a _____ storm event. The updated analysis identified _____ stations had excessive RDII. Appendix C lists the results of the analysis.

4.2 Basin Evaluation Protocol

Figure 4-1 is a flow chart of the Program procedure for ensuring that mainline sewers and manholes were not contributing to the RDII signature. All collection system repairs were initially completed under the previous I/I program and a RDII signature continued to remain after the mainline repairs were completed. Each basin was then subjected to an additional SSES program to correct any latent mainline defects and the basin manholes were then sealed to reduce system inflow. System flows were then observed during a significant 2 year storm event (4.5 inches in 24 hours) to quantify RDII flows entering the system. The station storm event signature serves as the "before" lateral repair signature. Basins which continued to exhibit storm event signatures were then candidates for the CLIP. These remaining stations had no outstanding mainline repairs and rainwater was not entering the system through the manhole covers.

A lateral inspection contractor was then selected through the competitive bidding process. All laterals in each basin were given a 3 to 5 psi air pressure test. In some instances the air tests were supplemented by hydrostatic tests and/or smoke tests, followed by video inspection. Figure-4-2 shows the lateral pressure test program protocol. Each lateral was first pressure tested from the main sewer to the No. 1 cleanout at the house. Laterals which passed the test were then considered acceptable with no further work required. Laterals which failed the initial full line pressure test were divided into segments and the public side from the street to the property line and the private side from the property line to the house were individually tested. If the public side failed the air test, the line was video televised to locate defects if it was over six feet deep. If it was less than six feet deep, it was not video televised and would automatically be a candidate for the dig and replace technology because of cost considerations. When the private side failed the air test it was then televised and smoke tested to locate the defects. The field data was recorded to notify the private owner of the condition of his lateral. All the field data was then evaluated and public side defect repairs were identified

4.0 Program Tasks April 2006

Table 4.1
CLIP Basin Characteristics
December 2000 Rain Event

Station	47	50	82	118	162	309	336	371	400	402	450	581	634	763	823	825	851
Usage	Res	Res	Ind	Res Com	Com		Res	Res						Res			
Pending Repairs	11	0	0	15	0	7	0	0			182			51	1		0
GPD1M	9,679	2,213	3,971		1,562	6,498	5,566	3,158			6,333			8,239	1,173		4,380
Length (ft)	13,650	Check	4,900	2,720 4,314	5,779	5,777	3,572	14,611	2,153		14,058			5,594	9,930		10,414
Discharge Gravity	G	G	G	G	FM	G/FM	G	FM*	FM	FM	FM			FM			
End Station	Υ	Υ	Υ	Υ	N		Υ	N			N			Υ			
Location	NCE	SCE	CC	NC	CW		CN	NNC			NC			CS			
Pumps	2	2	2	2	2		2	2						2			
Speed	Single	S	S	S	S		S	S						S			
NAPOT	5.2	1.76	2.73	2.95	.5		3.3	3.99			5.67			3.1	1.0		2.5
Dry Flow	115	30	10		10	25	10	80	7		120		3	100			60
RDII Peak	350	230	80		45	35	30	220	30		220		20	250			130
PF	3.04	7.66	8		4.5	1.4	3	2.25	4.3		1.8		6.6	2.5			2.2
Recovery	1 wk	2 da	5 da		3 da		3 da	4 da	4 da		2 da			3 da			6 da
Age	Old	Old															
2nd Pump/ hrs/yr	39	3	1	8	.1		13	11						<1			1
Priority	1	2	3	1	2	0	3	0	3	3	0	0	3	1	3	3	1
Well field	N	N	N	N	N		N	N									
Elevation																	
Tidal	Υ	Υ	?	N	N-Canal		N							N			

^{*}Repump 372

Figure 4-1
Basin Preparation Flow Chart

Figure 4-2 Lateral Pressure Test Protocol

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and defects located on the private side were referred to DERM for notification of the property owners.

A second RDII signature was then taken and compared to the "before" signature to determine program effectiveness.

4.2.1 Inspection Program Results

Each lateral in each basin was located and pressure tested for defects. Table 4.2, on the next page, lists specific data on each of the 52 basins in the CLIP. Under the program, a total of 9,202 laterals were pressure tested. Table 4.3 presents the results of the lateral test program.

Table 4.3
Air Test Program Results

		. • g . a	- COUITO				
		Public	·	Private			
Total Sewer Lines Tested: 9,202	Pass	Fail	CND	Pass	Fail	CND	N/A
Number:							
Percentage:							

On the public side of the lateral, 55 percent of the laterals passed the pressure test, 41 percent failed and 4 percent of the laterals could not be accessed (CND). On the private side, 38 percent of the laterals passed the pressure test, 21 percent failed and 33 percent could not be accessed (CND). An additional 8 percent could not be accessed because the customer denied access.

Table 4.2
Basin Characteristics (52 Basins)

Basin	Footage	Location	City of Miami	District	Wetwell Field Protection Area	Age	Main Line Material	No of Laterals	No of Stacks	Zoning	Peak Flow Factor 2001	RDII Signa- ture	Comments Selection Report
35	4,367	NW	Yes	3	No	1954		98	2	Commercial	1.4	No	
47	13,648	NW	Yes	3	No			453	193	Single Family / Multi-Family / Commercial		No	
58	4,767	CE	No	3	No	1946		95	5	Single Family	2.4	No	Tidal Influ- ence
70	507	CW	Yes	5	No			16	3	Multi-Family / Commercial	6	No	
80	20,414	CW	Yes	5	No			379	184	Multi-Family / Government	3	No	
82	4,906	CW	Yes	5	No			194	58	Single Family / Multi-Family	7.5	No	
118	4,314	NW	No	12	No	1972		33	4	Commercial	1.8	No	
126	1,895	CW	No	12	No	1986		23	4	Multi-Family / Commercial	2.7	No	Sweetwater Area
154	3,583	CW	No	12	No	1981		28	4	Commercial	2.8	No	
162	5,779	CW	No	12	No	1995		41	1	Commercial	6.4	No	
194	10,570	NW	No	12	Yes	1963		59	27	Commercial	8.6	No	
195	8,650	NW	No	12	Yes	1968		61	5	Commercial	2.4	No	
336	3,572	NW	No	13	No	1983		26	0	Commercial	11.7	No	
350	19,167	NW	No	1	No	1979		535	60	Single Family / Multi-Family	27	No	
355	16,101	NW	No	13	No	1960		249	27	Single Family	4.9	No	
358	1,614	NW	No	1	No	1957		67	1	Single Family	7.3	No	On edge of canal

Table 4.2
Basin Characteristics (52 Basins)

					Wetwell Field		ar actoristics				Peak Flow	RDII	Comments
Basin	Footage	Location	City of Miami	District	Protection Area	Age	Main Line Material	No of Laterals	No of Stacks	Zoning	Factor 2001	Signa- ture	Selection Report
364	16,101	NW	No	1	No	1971		357	32	Single Family	3.6	No	
378	13,317	NW	No	1	No	1955		237	32	Single Family	3.4	No	
380	8,453	NW	No	13	No	1968		192	5	Single Family	4	No	
405	1,354	NW	No	13	No	1967		21	2	Multi-Family	2.7	No	
410	8,907	NW	No	13	No	1980		109	11	Single Family / Multi-Family	6.3	No	
479	19,025	NW	No	13	No	1991		445	22	Multi-Family	3.5	No	
484	37,685	NW	No	13	No			915	29			No	
509	10,595	CW	No	10	Yes	1989		223	21	Multi-Family	3.5	No	
524	8,562	CW	No	10	Yes	1983		120	6	Single Family / Multi-Family / Commercial	2.9	No	
525	20,488	CW	No	10	Yes			628	1			No	
564	7,143	SW	No	9	No	1987		183	98	Single Family	5.4	No	On edge of canal
577	8,159	SE	No	8	No	1989		280	26	Multi-Family	3.1	No	
603	12,482	SE	No	8	No	1970		56	27	Commercial	2.7	No	
608	4,603	SW	No	9	No	1970		91	14	Single Family / Multi-Family / Commercial	5.8	No	
615	11,273	CW	No	10	Yes	1956		281	145	Single Family		No	
681	6,750	SW	No	9	No	1985		41	6	Agricultural	8.8	No	
708	11,816	SE	No	8	No	1958		217	71	Single Family	5.7	No	
722	17,725	SW	No	9	No	1972		52	4	Single Family	4	No	
729	5,044	SW	No	8	No	1970		71	37	Single Family	6.2	No	

Table 4.2
Basin Characteristics (52 Basins)

								1			Dools		
					Wetwell						Peak	DD!!	0
			City of		Field		Main Line	Noof	No of		Flow	RDII	Comments
Basin	Factors	Location	City of Miami	District	Protection	A ~ ~	Main Line	No of	No of	Zonina	Factor 2001	Signa-	Selection
	Footage			District	Area	Age	Material	Laterals	Stacks	Zoning		ture	Report
753	7,175	CW	No	10	Yes	1963		111	48	Single Family	4.8	No	
763	5,594	CW	No	7	Yes	1972		61	5	Multi-Family	1.66	No	
790	1,554	CW	No	7	No	1961		12	1	Commercial	4.8	No	
802	5,335	CW	No	8	Yes	1961		118	7	Multi-Family	5.9	No	
803	15,300	CW	No	8	No	1960		411	117	Single Family / Multi-Family / Commercial	2.6	No	
813	1,579	CW	No	10	No	1958		12	7	Single Family	5.4	No	
823	9,930	CW	No	8	Yes	1968		154	22	Single Family	3.4	No	
828	4,665	CW	No	8	Yes	1978		80	77	Single Family	3.1	No	
829	1,527	CW	No	8	Yes	1968		44	1	Multi-Family	3.4	No	
851	10,414	CW	No	10	Yes	1977		258	19	Multi-Family	1.8	No	
880	14,253	CW	No	8	Yes	1978		270	53	Single Family	2.7	No	Between a canal and lake
885	6,581	CW	No	8	Yes	1979		101	18	Single Family	2.7	No	
1004	10,340	SE	No	8	Yes	1953		224	39	Single Family / Multi-Family		No	
1031	4,725	SW	No	9	No	1989		106	41	Single Family	9.2	No	
1032	8,075	SE	No	9	No	1989		193	48	Single Family	3	No	
1033	9,594	SE	No	8	No	1990		304	43	Single Family	3.3	No	
1063	10,594	SE	No	8	No	1972		155	36	Single Family	4	No	

4.3 Lateral Repairs

Lateral repairs were identified by basin and grouped by repair type. If possible, they were grouped by location to reduce contractor travel time. Repairs were not issued for basins until they had a qualifying rain signature and the Road Moratorium List was checked to schedule lateral repairs before other road work.

4.3.1 Repair Identification

The following procedures for specifying lateral defect repairs were based on the selection of the least expensive repair technology which will affect the repair. The specified repair was based on unit price bids for the various repair technologies and the least expensive repair option was recommended.

The following steps are required before a repair call could be made:

- 1. Identify failed lateral
- 2. Review TV, if available
- 3. Determine mainline material
- 4. Determine lateral depth
- 5. Note restoration conditions
- 6. Identify pipe geometry
- 7. Determine stack condition

The purpose of each of these tasks is described below:

Lateral Identification

The failed laterals were identified and all related field data was available for review.

2. TV Review

If video was available it was reviewed along with the TV logs. The TV review identified the type of defects and their location. This provided information to allow the repair calls to be made.

3. Mainline Material

Most of the mainline sewers were either clay or PVC. However, some of the clay sewers were previously lined under the I/I Program. Lined sewers required special connections when the excavated point repair or dig and replace repairs

were made. Mainline sewers with cured-in-place (CIP) liners require the use of CIP saddle adapters while sewers with U-Liners installed require fused on saddles.

4. Lateral Depth

The lateral depth could determine the repair call. Laterals with connections up to six feet deep were considered shallow laterals and their repairs were usually completed with the excavated point repair or dig and replace technologies. It was usually most economical to use liner repair methods on deeper laterals with connections below six feet in depth.

5. Restoration Conditions

The cost of restoring the ground surface above excavations was factored into the repair call analysis. Often it was less expensive to use lining technologies when extensive restoration was required.

6. Piping Geometry

Some laterals had unique non-standard configurations with bends or fittings which would not accommodate lining technologies. These laterals required excavated point repair or dig and replace technologies.

7. Stack Condition

Some lateral configurations had stacks at the mainline sewer to provide connections for the laterals. Stack repairs could involve dig and replace or lining repair technologies.

Only laterals which failed the pressure test were considered defective and required repair. Bid prices from repair Contractors were used to determine the repair priorities. The lowest cost repair technology was used to repair defects. The following lateral component repairs were performed under the Program:

- Lateral Point Repairs
- Lateral Connection Repairs
- Full Line Repairs
- Full Line with Crushed Section Repairs
- Stack Repairs

Each of these component repairs are described below:

1. Lateral Point Repairs – Required when the lateral and lateral connection is good but a portion (less than 10 foot length) of the lateral requires repair.

- 2. Lateral Connection Repair Required when the lateral is in good condition but the connection to the mainline sewer is defective.
- 3. Full Lateral Repair Required when the entire lateral is defective. Full lateral replacement also requires the replacement of the mainline sewer connection.
- 4. Full Lateral with Crushed Segment Repair Required when the lateral is deteriorated and a portion of it was crushed. Specified repairs could include the dig and replacement technology and/or liner repairs.
- 5. Stack Repair Required when the stack was defective. May be performed in conjunction with other liner system repairs. May require an excavated point repair or liner repair technology.

Unit price bids were obtained through the competitive bid process for the point repair, dig and replace and cured-in-place liner technologies. These technologies were specified under the following conditions:

- Excavated Point Repairs and Full Service Lateral Replacement Used when trenchless technologies are inappropriate – for collapsed pipe, severe offset joints, dropped pipe and medium to heavy root intrusion. The excavated point repair replaces up to 10 feet of pipe and was sometimes used in conjunction with a liner. The full service lateral replacement included the Y connection and pipe up to Cleanout No. 2 at the property line. This repair was used for over 90 percent of the repairs since defective laterals less than six feet deep were replaced.
- Cured-in-Place Liners Used for structural damage where excavated point repair or full lateral replacement exceeded liner costs. Depending on the location, amount and severity of breaks or defects, three types of liners were used: 1) Standard CIP liner, 2) Standard CIP liner with mainline connection, and 3) Standard CIP liner with mainline connection and full circle mainline sectional.
- Cured-in-Place Mainline/Lateral Repair System Same as the CIP liner system except the mainline/lateral liner is a one piece installation and not a three component repair (CIP liner, mainline connection and mainline sectional). This repair technology

cally a monolithic liner with a mainline connection to a full circle mainline sectional. It was used for structural damage where excavated point repair, full lateral replacement or cured-in-place liner component costs exceeded the liner system costs.

4.3.2 Repair Protocol Matrix

Table 4.4 lists all possible Program repair call-outs for the various lateral conditions. It indicates the repair type or lateral component requiring repair and the recommended repair for the various lateral conditions. Lateral conditions include the location and extent of the defect, the depth of the repair and the amount of surface restoration required.

In general, shallow laterals were repaired by the excavated point repair or dig and replace technologies as this was the most cost effective solution. Liner technologies were used if the excavated repair plus the restoration cost exceeded the liner technology cost. Liner technologies were specified for deeper laterals where the liner cost was less then the total dig and replacement costs.

Field personnel provided constant feed back to the office personnel and the protocol matrix was modified as required.

4.0 Program Tasks

Table 4.4
Lateral Repair Protocol Matrix

·	Shall	ow (<6')	Deep (>6')	
Repair Type	Standard Restoration	Extensive Restoration	Standard Restoration	Extensive Restoration
Lateral Point Repair:	Point Repair	Point Report or Standard CIP	Standard CIP Liner	Standard CIP Liner
 Connection good 		Liner if lower cost		
 Lateral good but portion 				
(<10') need repair				
Lateral Connection Repair:	Lateral Connection	Lateral Connection	Lateral Connection	Lateral Connection
 Lateral good 	Point Repair:	Point Repair:	Point Repair:	Point Repair:
Connection to main sewer	Clay/PVC: Replace	Clay/PVC mainline:	Clay/PVC mainline:	Clay/PVC mainline:
needs repair	with sleeves	Replace with sleeves or	Top hat (no major roots)	Top hat (no major roots)
 Roots at connection only 	CIP mainline: CIP	top hat if lower cost	CIP mainline: CIP	CIP mainline: CIP
	saddle adapter	CIP mainline: CIP	saddle adapter	saddle adapter
	U-Liner: Fused on saddle	saddle adapter	U-Liner mainline:	U-Liner mainline:
		U-Liner mainline:	Fused on saddle	Fused on saddle
		Fused on saddle		
Full Line Deterioration:	Dig and Replace Including	Dig and Replace Including	Top Hat and Liner (no major	Top Hat and Liner (no major
 Fully deteriorated lateral 	Connection (see above)	Connection (see above) or Top	roots) or T-Liner (no major	roots) or T-Liner (no major
 Roots throughout lateral 		Hat and liner (no major roots)	roots) if lower cost Dig and	roots) if lower cost Dig and
		or T-Liner (no major roots)	replace if major roots	replace if major roots
		Depending on lower cost		
Full Line Deteriorated with	Dig and Replace Including	Dig and Replace Including	Dig and Replace Including	Dig and Replace Including
Crushed Section:	Connection (see above)	Connection (see above)	Connection (see above) or	Connection (see above) or
 Lateral deteriorated but 			Pont Repair and CIP liner (no	Pont Repair and CIP liner
section crushed			major roots) if lower cost	(no major roots) if lower cost
Deteriorated Stack	Point Repair	Point Repair or CIP liner or	Point Repair or CIP liner or	Point Repair or CIP liner or
		T-Liner Depending on lower	T-Liner Depending on	T-Liner Depending on
		cost	lower cost	lower cost
Lateral configuration not	Dig and Replace	Dig and Replace	Dig and Replace	Dig and Replace
conducive to lining				

4.3.3 Implementation

CLIP office staff made the repair calls based on the condition of the lateral and the repair identified in the matrix. If a repair call was made which was contrary to that specified in the matrix, the specified repair was reviewed with the Program Manager and the reason for the modifications documented. Any deviations were also approved by the Department Project Manager in writing. When TV was not available on shallow lines without extensive restoration or no defects were indicated on the video, dig and replace call-outs were made since this was the most cost effective repair technology. If no defects were indicated on deep lines, these lines were deferred to Department forces for further investigations. Replacement technologies were specified for sewer lines with medium or extensive roots present since this was the most cost effective repair technology.

4.4 Public Outreach Program

The Public Outreach Program consisted of four sub programs which interfaced with the public. These were the:

- 1. Door Hanger Program
- 2. Private Lateral Test Approval Program
- 3. Defect Notification Program
- 4. Public Information Program

Each of the tasks are described below:

4.4.1 Door Hanger Program

Door hangers were made to notify the public of future field activities in their neighborhood. The purpose of the hangers was to notify the customers of the work to be performed in the field, to provide a contact number, and to provide instructions for the curtailment of sewer usage activities. Department forces and contractors working in the area were required to deliver the hangers 24 hours before the start of field activities. Figure 4-3 is an example of the door hanger distributed for the inspection and repair activities.

4.4.2 Private Lateral Test Approval Program

Sewer laterals consist of the "public" portion which runs from the mainline sewer in the street to the property line and the "private" portion which runs from the property line to the structure being served. Department forces are responsible for maintaining the public portion of the sewer and the property owner is responsible for the private portion of the sewer. Since RDII flows could originate from both portions of the lateral, the Department desired to pressure test both sewer sections under the CLIP.



MIAMI-DADE COUNTY WATER AND SEWER DEPARTMENT

LATERAL INSPECTIONS

The Miami-Dade Water and Sewer Department (MDWASD) and/or its representatives will be performing maintenance inspections on the sewer laterals in your neighborhood.

The work could involve minor excavation in the public right-of-way area and in front of your house to gain access to inspect the sewer lateral for defects.

If you have previously consented (signed and returned the letter sent to property owners) to allow MDWASD to inspect the sewer lateral on your private property, please be aware that your home or property may be affected. The inspection work will be done at no cost to the homeowner and your property will be restored to original condition.

We will contact you and ask you to curtail household discharges to the sewer (showers, toilet flushing, sink, etc) when the testing takes place.

Thank you for your cooperation. If you have any questions, please call Ms. Charo Muñoz at (305) 443-4001.

H. The Core

Figure 4-3
Door Hanger Example

It was determined by the County Attorney's Office that the Department must obtain written approval from each sewer customer in order to inspect the private side of the sewer owned by the property owner. Letters addressed to each individual property owner were required in order to request written approval for the private lateral testing.

Customer Letters

In order to begin identifying the individual property owners it was first necessary to purchase temporary access to an online IRIS database that identified the property information. This service is updated regularly and allows the user to download multiple properties using their graphic interface. The team also used the basin (GIS) maps generated from information provided by the Department. The combination of the IRIS interface and the basin maps, allowed the applicable property data to be identified and downloaded.

A quality control process was also implemented to guarantee that all the properties were identified. To accomplish this goal, the CLIP team relied on the Miami-Dade County Property Appraiser's website. This portal, known as "My Home", uses GIS application to provide Real Property information on individual parcels of land. The website allowed the verification of properties within each basin boundary.

The property data was collected and stored in an MS Access database, called "Property Owners Database". The database provided the necessary tool to issue the letters, and to keep track of the communication needed to monitor the program. A total of 9,202 property owners were identified for the 52 CLIP basins.

A form letter was developed to describe the CLIP and request the property owner's permission to test their private lateral. The letters were written in English, Spanish, and Creole. Figure 4-4 is a typical letter. The letters were mailed out according to the established basin inspection priority sequence. The first 9,202 letters were mailed out by November 2004. An additional 4,393 follow-up letters (typical letter in Figure 4-5, were sent to property owners who did not respond to the initial letter. These letters were sent in early February 2005. Figure 4-6 is a typical mailing status report.

Public Response

Table 4.5 shows the results of the Public Outreach Program. A total of 9,202 letters were mailed to customers requesting access to their laterals. A total of 4,809 of the customers responded with 4,759 or 52 percent allowing access and 50 or 0.5 percent of the customers denying access. The remaining 4,393 customers did not respond to the request. A total of 4,393 follow-up letters were mailed with 1,626 or 36 percent response. Once again, 2,767 customers did not respond to the follow-up letter.





MIAMI-DADE WATER AND SEWER DEPARTMENT
PO. Box 330316, Miami, Florida 33233-0316 • 3071 S.W. 38th Avenue • Tel: 305-665-7471

August 31, 2004

City of Miami Dept. Of P&D Asset Management Division 444 SW 2nd Ave Ste 325 Miami, FL 33130-1914

Dear Property Owner(s):

In an effort to prevent groundwater from entering into the Miami-Dade Water and Sewer Department's (Department) sewer system and reduce sewer overflows, the Department is implementing a Sewer Lateral Pilot Test Program, as mandated by the Environmental Protection Agency (EPA). This program will require inspection of both the County-owned and privately-owned sewer laterals that serve individual properties throughout the system. It will be necessary to repair the sewer laterals that are found to be defective. Repairs to the sewer laterals in the public right-of-way will be the responsibility of the County while customers will be responsible for repairs on their private property.

The work includes gaining access to the sewer lateral to perform various tests to check for leaks. The tests will be performed on all sewer laterals in the public right-of-way. With your approval, the Department or its representatives will also perform tests on the sewer lateral on your property at no cost to you. In the event that you do not allow the Department access to your property, you may be asked to inspect the line at your own expense as required by Chapter 24 of the Code of Miami-Dade County, Florida.

Your signature below is required in order for representatives to gain access to your property to inspect the sewer lateral. Please designate your response below and return this signed form to us in the enclosed envelope.

Should you have any questions, please call Mr. David Sayers at (305) 625-4101.

Sincerely,

John W. Chorlog, Jr., P.E. Deputy Director - Operations

Miami-Dade Water and Sewer Department

Please complete below by checking only one of the two boxes shown:

I agree to allow access to my property (Folio #0131120130290) and sewer lateral.

I do not agree to allow access to my property (Folio #0131120130290) and sewer lateral.

(Signature of Property Owner)

Figure 4-4 Owner Request Letter







MIAMI-DADE WATER AND SEWER DEPARTMENT P.O. Box 330316, Miami, Florida 33233-0316 • 3071 S.W. 38th Avenue • Tel: 305-665-7471

January 28, 2005

Subject: Second Notice for Participation in Program

Dear Property Owner(s):

We previously sent you a letter requesting your participation in our Sewer Lateral Pilot Test Program mandated by the Environmental Protection Agency (EPA). To date, we have not received your response.

Please review the attached letter, check one box indicating either 1) if you agree to allow access to your property or 2) if you do not agree to allow access to your property, and sign and return the letter in the enclosed pre-paid postage envelope.

Should you have any questions, please call Mr. David Sayers at (305) 625-4101.

Sincerely,

John W. Chorlog, Jr., P.E. **Deputy Director - Operations**

Miami-Dade Water and Sewer Department

Environmental Engineers & Scientists

MIAMI-DADE COUNTY WATER AND SEWER

Miami-Dade Water and Sewer Department



COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP) MAILING STATUS REPORT

ВАТСН	BASINS	LANGUAGE		SENT TO WASD		SD SENT ERS OUT
			QUANT.	DATE	QUANT.	DATE
1	35,154, 195 ⁽¹⁾ , 336, 358, 524 ⁽¹⁾ , 681, 885	English	279	12-Aug-04	279	16-Aug-04
1a	154, 195 ⁽¹⁾ , 336, 358, 524 ⁽¹⁾ , 681, 885	English/Spanish	264	14-Sep-04	264	23-Sep-04
1b	35	English/Creole	15	17-Sep-04	15	23-Sep-04
2	47	English/Creole	156	17-Sep-04	156	23-Sep-04
3	80, 195 ⁽²⁾ , 364, 524 ⁽²⁾ , 880	English/Spanish	1,200	2-Sep-04	1,200	10-Sep-04
4	378	English/Spanish	649	8-Sep-04	649	10-Sep-04
5	410	English/Spanish	148	9-Sep-04	148	23-Sep-04
6	479, 509, 525, 603, 615, 708, 722, 729, 753, 802, 803, 813, 823	English/Spanish	1,343	17-Sep-04	1,343	23-Sep-04
7	828, 851, 1004, 1031, 1032, 1033, 1063	English/Spanish	937	21-Sep-04	937	4-Oct-04
8	194, 608, 350, 380	English/Spanish	459	21-Sep-04	459	4-Oct-04
9 ⁽³⁾	58, 70, 80, 82, 118, 126, 154, 162, 378, 479, 509, 525, 577, 603, 608, 615, 763, 802, 803, 813, 828, 829, 851, 1031	English/Spanish	2,284	23-Sep-04	2,284	4-Oct-04
10 ⁽³⁾	35,47	English/Creole	123	28-Sep-04	123	4-Oct-04
11 ⁽³⁾	350,803 and 790	English/Spanish	369	28-Sep-04	369	4-Oct-04
12	484	English/Spanish	346	12-Oct-04	346	22-Oct-04
13	484	English/Spanish	599	14-Oct-04	599	22-Oct-04
14	350, 405, 509, 763, 829, 851	English/Spanish	102	14-Oct-04	102	22-Oct-04
15	35, 58, 126, 763, 813	English/Spanish	10	15-Oct-04	10	8-Nov-04
16	564	English/Spanish	198	2-Nov-04	198	8-Nov-04
17	80, 355, 364, 410, 524	English/Spanish	7	3-Nov-04	7	8-Nov-04
18	47	English/Creole	4	4-Nov-04	4	8-Nov-04
	SECOND NO	TIFICATIONS				
100	1004, 1031, 1033, 1063	English/Spanish	304	21-Jan-05	304	25-Jan-05
101	564, 608, 851	English/Spanish	234	21-Jan-05	234	25-Jan-05
102	70, 82, 118, 162, 194, 195, 336, 355	English/Spanish	357	28-Jan-05	357	1-Feb-05
103	358, 364, 378	English/Spanish	336	1-Feb-05	336	4-Feb-05
104	380, 410, 525	English/Spanish	423	1-Feb-05	423	4-Feb-05
105	484	English/Spanish	478	1-Feb-05	478	4-Feb-05
106	603, 615, 681, 708, 722	English/Spanish	301	3-Feb-05	301	8-Feb-05
107	753, 802, 823, 729	English/Spanish	223	9-Feb-05	223	25-Feb-05
108	880, 885, 1004, 1032	English/Spanish	232	9-Feb-05	232	25-Feb-05
109	58, 80, 126, 154	English/Spanish	447	9-Feb-05	447	25-Feb-05
110	405, 479, 509	English/Spanish	329	9-Feb-05	329	25-Feb-05
111	524, 577, 763, 803	English/Spanish	362	10-Feb-05	362	15-Feb-05
112	813, 829, 851	English/Spanish	117	10-Feb-05	117	15-Feb-05
113	35, 47	English/Creole	146	10-Feb-05	146	15-Feb-05
114	350, 405, 509	English/Spanish	4	5-Apr-05	4	7-Apr-05
115	47	English/Creole	1	5-Apr-05	1	7-Apr-05
116	194, 350, 355, 378, 410, 484, 524, 525, 564, 577, 603, 708, 803, 823, 851, 880, 885, 1033, 1063	English/Spanish	34	5-Apr-05	34	7-Apr-05
	TOTAL PROCESSED		9,	9,202		,202
	TOTAL PROPERTIES		9,	202	9	,202
1 Single Uni	its	"YES" Responses	6	302	68	3.49%
² Multiple U		"NO" Responses		230		.50%
_	Addresses from Multiple Units	TOTAL Responses		532		0.98%
		PENDING Responses	· · · · · · · · · · · · · · · · · · ·			
		TOTAL		202		0.00%







in association with CARDOZO ENGINEERING - CIVIL-CADD - SAN MARTIN ASSOCIATES

Figure 4-6
Typical Mailing Status Report



The Public Outreach Program was very successful with 70 percent of the lateral owners responding and 98 percent of the respondents allowing their laterals to be pressure tested. Only 2 percent of the customers denied the Department access to their lateral.

Table 4.5
Public Outreach Program Results

Fublic Outleach Fi	ogram Results	
Description	Quantity	Percent
Initial Letters	9,202	100.00
"Yes" Responses	4,759	51.72
"No" Responses	50	0.54
Total Responses	4,809	52.26
Follow-Up Letters	4,393	100.00
"Yes" Responses	1,542	35.10
"No" Responses	179	4.07
Total Responses	1,721	39.18
Outreach Program Results		
Total Laterals	9,202	100.00
"Yes" Responses	6,301	68.47
"No" Responses	229	2.49
Total Responses	6,530	70.96

Field crews were not allowed to test private sewer laterals without written approval. During the field work, however, crews approached the homeowner and received written permission to test an additional 101 laterals. Occasionally the field crews were stopped by the homeowner from testing the private sewer even though they were given written permission. These incidents were small however, and did not substantially affect the Program results.

4.4.3 Defect Notification Program

Private laterals which failed the pressure test were televised and smoke tested to confirm the presence of the defect. The homeowner was then notified of the condition of his sewer. Figures 4-7 and 4-8 are copies of the form letters on DERM, the local regulatory agency, letterhead notifying the customers of the status of their lateral.



Miami-Dade Water and Sewer Department
P. O. Box 330316 • 3071 SW 38th Avenue
Miami, Horida 33233-0316
T 305-665-7471

miamidade.gov

DC: 1236 CCN: G9008.4.1

ADA Coordination
Agenda Coordination
Art in Public Flaces
Audit and Management Services
Aviation
Building Code Compliance
Building Dusiness Development

Capital Improvements
Citizen's Independent Transportation Trust
Communications

Community Action Agency Community & Economic Development

Community & Economic Development

Community Relations

Consumer Services

Corrections & Rehabilitation Countywide Healthcare Planning

Cultural Affairs Elections

Employee Relations

Employee Relations
Enterprise Technology Services

Environmental Resources Management

Fair Employment Practices

Fire Rescue

General Services Administration

Historic Preservation

Homeless Trust

Housing Finance Authority

Human Services

Independent Review Panel International Trade Consortium

Juvenile Assessment Center Medical Examiner

Metropolitan Planning Organization

Park and Recreation

Planning and Zoning

Procurement Management

Property Appraiser

Public Library System

Public Works

Safe Neighborhood Parks

Seaport

Solid Waste Management

Strategic Business Management

Team Metro

Urban Revitalization Task Force Vizcaya Museum and Gardens

Water and Sewer

Subject: Tuberculated Private Sewer Lateral Folio No.

Dear Property Owner:

During the past year, the Miami-Dade Water and Sewer Department has performed an inspection of the sewer lateral to your home. The inspection has found that the privately owned portion of the sewer lateral from the property line to your home is in questionable condition. As the homeowner, you are responsible for the maintenance and repair of the portion of the lateral located on your property.

The attached picture shows significant build-up and corrosion. This condition is called tuberculation, and severe tuberculation may lead to sewer back-ups in your home. Therefore, it is recommended that you contact a certified plumber to evaluate the condition of your lateral.

Should you have any questions, please contact Ms. Maria Fernanda Castro at (305) 443-4001.

Sincerely,

John W. Chorlog, Jr., P.E. Associate Director – Operations

Cc: Jose Lopez/DERM Roy Patrick/DERM



40650-000R011.cdr

Figure 4-7
Private Lateral Condition Letter
Tuberculated Lateral







Miami-Dade Water and Sewer Department P. O. Box 330316 • 3071 SW 38th Avenue Miami, Florida 33233-0316 T 305-665-7471

miamidade.gov

DC: 1237 CCN: G9008.4.2

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Capital Improvements
spendent Transportation Trust

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Community Action Agency
Community & Foonomic Development

Consumer Services
Corrections & Rehabilitation

Community Relations

Countywide Healthcare Planning Cultural Affairs

Hertions
Emergency Management

Employee Relations
Finterprise Technology Services

Enterprise Technology Services

Environmental Resources Management

Fair Employment Practices Finance

Fire Rescue

General Services Administration

Historic Preservation
Horseless Trust
Housing Agency

Housing Finance Authority

Human Services

Independent Review Fanel

International Irade Consortium Inventile Assessment Center

Medical Examiner

Metropolitan Planning Organization Park and Recreation

Planning and Zoning Police

Procurement Management Property Appraiser

ublic Library System

Public Works

Safe Neighborhood Parks

Scaport Solid Waste Management

Sono wase Managero

Team Metr

Transit

Urban Revitalization Task Force
Vizcava Museum and Gardens

Water and Sewer

Subject: Failed Private Sewer Lateral Pressure Test Folio No.

Dear Property Owner:

During the past year, the Miami-Dade Water and Sewer Department has performed an inspection of the sewer lateral to your home. The inspection has found that the privately owned portion of the sewer lateral from the property line to your home is in questionable condition. As the homeowner, you are responsible for the maintenance and repair of the portion of the lateral located on your property.

A pressure test was performed and the private sewer lateral did not pass the test. Please see the attached pressure test results. Therefore, it is highly recommended that you contact a certified plumber to evaluate the condition of your lateral.

Should you have any questions, please contact Ms. Maria Fernanda Castro at $(305)\,443-4001$.

Sincerely,

John W. Chorlog, Jr., P.E. Associate Director – Operations

Cc: Jose Lopez/DERM Roy Patrick/DERM



Figure 4-8
Private Lateral Condition Letter
Non-Tuberculated Lateral



4.4.4 Public Information Program

CLIP staff members were available to respond to customer calls during all phases of the Program. The most calls were received during the Private Lateral Test Approval Program. During the program over 800 customer calls were addressed. Table 4.6 (on the next page) is a copy of the call tracking report and Figure 4-9 lists the most common questions asked by the customers.

4.5 Conflict Verification Program

The CLIP inspection and repair work may conflict with scheduled or ongoing construction projects by other agencies. The objective of the Conflict Verification Program was to identify other repair work within the CLIP basin areas and to coordinate the CLIP activities with those of the other programs. Often there is a construction moratorium period in areas where previous construction projects have recently paved roads.

Ideally, the CLIP work will be performed before the road work is completed. A request for clearance was received by the Program from various agencies through the Department's Utilities Liaison Division which listed other agency's proposed roadway projects and construction schedules. Each proposed construction project was identified by the CLIP, the boundaries of the individual road projects were identified and plotted on the CLIP Program basin maps and potential conflicts were then identified and highlighted on the maps. The following are the agencies that participated in the conflict verification program:

- Miami Dade Public Works Department
- Florida Department of Transportation
- City of Miami
- FEMA / DORM

Figure 4-10 is a typical Program summary report of other project conflicts.

In order to promote the coordination of the conflict projects with the other agencies, letters were issued by the CLIP staff and sent to each of the agencies with maps showing conflict areas. The letters were updated every two months in order to notify the various agencies of the status of the Program field work.

Table 4.6
Call Tracking Repor

	Call Tracking Report Persons Taking & (Returning) Phone Total											
					(Return			Total				
Index	Date	Mary	Carol	Charo	Dave	JoAnn	Helen	Daily	Comments			
1	9-Sep-04	0	0	0	5	0	0	5				
2	10-Sep-04	4	5	0	10	0	0	19				
3	13-Sep-04	5	4	5	6	0	0	20				
4	14-Sep-04	4	5	8	8	1	0	26				
5	15-Sep-04	2	4	4	4	0	1	15				
6	16-Sep-04	12	7	7	6	0	0	32				
7	17-Sep-04	10	2	10	7	0	0	29				
8	20-Sep-04	2	0	5	4	0	0	11				
9	21-Sep-04	2	0	2	5	0	0	9				
10	22-Sep-04	5	1	1	3	0	0	10				
11	23-Sep-04	1	1	1	1	0	0	4				
12	24-Sep-04	4	5	5	5	0	0	19				
13	27-Sep-04	5	2	7	18	0	0	32				
14	28-Sep-04	5	2	3	8	0	0	18				
15	29-Sep-04	0	6	13	13	0	0	32				
16	30-Sep-04	6	4	23	19	0	0	52				
17	1-Oct-04	3	4	6	13	0	0	26				
18	4-Oct-04	18	0	6	0	0	0	24				
19	5-Oct-04	22	2	10	0	0	0	34				
20	6-Oct-04	3	2	5	0	0	0	10				
21	7-Oct-04	4	2	2	13	0	0	21				
22	8-Oct-04	4	0	4	9	0	0	17				
23	11-Oct-04	3	1	2	9	0	0	15				
24	12-Oct-04	1	1	0	7	0	0	9				
25	13-Oct-04	1	0	1	9	0	1	12				
26	14-Oct-04	0	1	0	5	0	0	6				
27	15-Oct-04	0	1	0	6	0	0	7				
28	18-Oct-04	4	3	3	7	0	0	17				
29	19-Oct-04	0	1	0	3	0	0	4				
30	20-Oct-04	0	0	1	6	0	0	7				
31	21-Oct-04	0	0	6	3	0	0	9				
32	22-Oct-04	0	0	3	9	0	0	12				
33	25-Oct-04	0	1	2	4	0	0	7				
34	26-Oct-04	0	0	0	2	0	0	2				
35	27-Oct-04	0	0	1	1	0	0	2				
36	28-Oct-04	1	0	1	3	0	0	5				
37	29-Oct-04	0	0	0	2	0	0	2				
38	1-Nov-04	0	0	0	1	0	0	1				
39	2-Nov-04	0	0	0	0	0	0	0				
40	3-Nov-04	0	0	0	0	0	0	0				
41	4-Nov-04	0	0	3	2	0	0	5				
42	5-Nov-04	0	0	0	1	0	0	1				
43	8-Nov-04	0	0	1	3	0	0	4				
				<u> </u>				•	l			

40650-000R016.cdr

MIAMI-DADE WATER AND SEWER DEPARTMENT Comprehensive Lateral Inspection Program Frequently Asked Questions List as of February 10, 2005



- Q1: Why was my area chosen for the pilot test?
- A1: Your area is one of the several basins chosen for the pilot test program. The basins were selected based on certain criteria (e.g. age & type of lateral/pipe, zoning and land use, basin size, basin age, basin location, peaking factor, rainfall dependent inflow and infiltration (RDII), among others). All residents and businesses within the selected basins are being contacted.
- Q2: What are the **boundaries** of the pilot test area?
- A2: There are several pilot test areas, which fall within various WASD management basins. [Yours falls within a basin that was qualified to participate in the pilot test]. There are almost 1000 basins within the MDWASD system, and there are approximately 30 basins selected to participate in the pilot program. These basins are located all over the county, including north, south, central, etc. Every basin is different in size and location.
- Q3: A **Smoke Test** was previously done. Why are they testing with **cameras** now?
- A3: The smoke test performed might not have provided a clear indication as to the lateral defect and/or location. The camera is just another method to locate and identify a possible lateral defect.
- Q4: When will the testing begin?
- A4: Inspection and Testing has already begun for some drainage basins. However, some inspections may start as late as December 2005. You will be further notified prior to the time actual test. You will be notified 48-hours prior to the day of your test. Notice will be given by door hangers (flyers). A new **Contact Phone Number** will be printed on the hanger (flyer).
- Q5: If needed, how expensive will the repairs be?
- A5: Well, right now, WASD is offering to inspect your sewer laterals at no cost to you, which is a saving of \$250 to \$400. [In the event that you do not allow the Department access to your property, you may be asked to inspect your sewer line at your own expense.] Repair costs will vary, but typical repairs might run approximately \$1,000 [including inspection costs]. If private repairs are required, it is the sole responsibility of the property owner to secure a licensed plumbing contractor to make the necessary private repairs.
- Q6: How can I review Chapter 24 of the Miami-Dade County Code?
- A6: Miami Dade County Chapter 24 may be accessed at http://www.miamidade.gov/derm/code_ordinances_ch24.asp. Specifically, Section 24-13.1 "Sanitary Sewer System Collection and Transmission Systems"
- Q7: If I have a **septic system** should I still send in a response?
- A7: Yes. Please include why you indicate "no access allowed" by writing in: "SEPTIC TANK/SYSTEM."

- Q8: Why do you need "access" to my property to do this inspection?
- A8: Access to your property is needed to isolate your lateral from the public system for inspection and testing to ensure compliance. This pilot program is part of an EPA mandated program.
- Q9: Will you be digging on my property?
- A9: MDWASD will try to locate the existing clean outs (COs) and excavate on the public property. If the COs are not located, as a last resort, we may have to excavate on your property to carry out the pilot testing. However, we will return your property to its original state, or better, at no cost to you.
- Q10: How many times will you have to be on the property?
- A10: Contractors will need to visit your property no more than three times; first for testing/inspection, second for repairs on the "public system" **ONLY if necessary,** and third, for final inspection of the completed repairs.
- Q11: Will Miami-Dade Water and Sewer Department provide contractors [or a list of contractors] to conduct repairs?
- A11: No. Miami-Dade Water and Sewer Department will NOT provide a list of private contractors. The property-owner will contact, select, retain and pay plumbing contractor(s) to complete repairs to their private lateral if necessary.
- Q12: In the event that a defect is found in the sewer lateral on the "private side" how soon would the property owner be required to complete repairs?
- A12: Currently, Miami-Dade Water and Sewer Department has not finalized the process of notifying and instructing property-owners regarding private repairs. However, property owners will be allowed a reasonable period (e.g., 3 to 9 months???) to effect repairs by a licensed plumber. [Still under review do NOT use this response]
- Q13: I have a problem that is ongoing and not necessarily related to the Pilot Test Program, whom should I contact?
- A13: Basic Customer Service: 305-665-7488 Complaint Unit:: 786-552-8970
- Q14: I received a reminder letter. The reminder insert matches my personal and property information (as shown on the envelope) BUT the response form has someone else's (a) name, (b) address, and (c) folio number. How should I respond?
- A14: Obtain their information: (a) Name, (b) Mailing Address, and (c) Folio Number (if available); Obtain the other person's (a) Name, (b) Mailing Address, and (c) Folio Number. Instruct them to "toss" the letter and its contents and expect another in the mail with the correct information.

Figure 4-9

Commonly Asked Questions







MIAMI-DADE WATER AND SEWER DEPARTMENT COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP) MONTHLY CONFLICT VERIFICATION STATUS REPORT April 5, 2005

					Morator	ium Dates	Atlas	
Category	Basin #	Roadway Address	Department	Description	Start	End	Page	Comments
	35	US 1/Biscayne Blvd. NE 78- 87 St.	FDOT	Flexible Pavemt. Rcons			E9	Jan. '07
В	47	NE 2 Ave, 79 St - 86 St	PW	Newly Paved	Aug 03	Aug 06	F9	Inspection/Testing Completed (100%)
Α	82	NW 17 St. and NW 35 Ave	MDWASD	New Force Main		Ŭ	J13	Inspection/Testing Complete (100%)
С	118	NW 60 St, 82 - 79 Ave	Fema/Dorm	Resurfacing			P10	Construction Complete
В	162	NW 25 St, 87 Ave - 89 PI	Fema/Dorm	Drainage			P12	Construction Underway
В	162	NW 25 St, 82 Ave - 68 Ave	PW	Construction of Viaduct			P12	Est. Start Date April '06
В	162	Intersection of NW 25 St & 82 Ave	PW	Newly Paved	Feb 03	Feb 06	P12	Moratorium Expired
В	162	NW 30 Ter, NW 82 - 87 Ave	Fema/Dorm	Resurfacing			P12	Est. Start Date July '06
В	162	NW 25 St, SR 826 - NW 67 Ave	FDOT	Add Lanes			P12	Est. Start Date July '06
В	162	NW 25 St, 87 Ave - SR 826	FDOT	Add Lanes			P12	Est. Start Date July '06
Α	194	7209 NW 66 St	PW	Drainage			N10	Inspection/Testing Complete (100%)
Α	194	NW 66 St, 72 - 74 Ave	Fema/Dorm	Resurfacing			N10	Inspection/Testing Complete (100%)
A	194	NW 72 Ave, 58 - 66 St	Fema/Dorm	Drainage			N10	Inspection/Testing Complete (100%)
Α	195	NW 68 St, 72 - End of road	Fema/Dorm	Moderate damage			N10	Inspection/Testing Complete (100%)
A C	195	NW 72 Ave, 66 - 74 St	Fema/Dorm PW	Drainage	Inn OF	lan 00	N10 K3	Inspection/Testing Complete (100%)
С	358 364	NW 167 - 183 St & NW 37-47 Ave NW 203 Ter, 42 Ct - 47 Ave	Fema/Dorm	Newly Paved	Jan 05	Jan 08	L1	Inspection/Testing Complete (100%) Inspection/Testing Complete (100%)
C	364	NW 203 Ter, 43 - 47 Ave	Fema/Dorm	Drainage Reconstruction			L1	Inspection/Testing Complete (100%)
C	364	NW 205 St, 43 Ct - 43 PI	Fema/Dorm	Resurfacing			L1	Inspection/Testing Complete (100%)
C	364	NW 205 St, 43 Ct - 43 Pl NW 207 Dr, 43 Ct - 47 Ave	Fema/Dorm	Resurfacing			L1	Inspection/Testing Complete (100%)
C	364	NW 47 Ave - End of road	Fema/Dorm	Drainage			L1	Inspection/Testing Complete (100%)
C	364	NW 47 Ave - Elia 6116ad NW 47 Ave, 183 - 215 St	FDOT	Milling & Resurfacing			K1	FDOT Const. Yr. '07-'08
C	378	NW 183 St, 27 - 37 Ave	Fema/Dorm	Drainage			J2	
C	378	NW 183 St, 34 Ct - 32 Ave	Fema/Dorm	Moderate damage			J2	
C	378	NW 182 St, 32 Ave - 35 Ct	Fema/Dorm	Drainage Drainage			J3	
Č	378	NW 183 St, 27 Ave - 37 Ave	Fema/Dorm	Drainage			J3	
С	378	NW 167 - 183 St & NW 27-37 Ave	PW	Resurfacing			J2	Pending assignment
С	378	NW 32 Ave, 167 St - 183 St	Fema/Dorm	Drainage			J3	
Α	509	SW 72 St. SW 117 - 107 Ave.	FDOT	Resurfacing			S18	Const.Year '06-'07 Insp. Completed
Α	525	SW 88 - 104 St, & 117 - 127 Ave	PW	Newly Paved	Mar 03	Mar 06	T20	Moratorium Expired
Α	608	SW 208 St, 118 PI - 120 PI	CICC - PW	Drainage			T27	Inspection/Testing Complete (100%)
Α	608	SW 122 Ave, 200 - 210 St	Fema/Dorm	Resurfacing			T27	Inspection/Testing Complete (100%)
Α	615	SW 40 - 47 St, & 107 - 112 Ave	PW	Resurfacing			S17	Completed
Α	615	SW 48 St - 56 St, & 112 - 117 Ave	PW	Newly Paved	Jan 05	Jan 08	S17	
Α	615	SW 107 Ct, 40 Ter - 43 Ter	Fema/Dorm	Drainage			S17	Resurfacing
Α	615	SW 107 PI, 40 Ter - 42 St	Fema/Dorm				S17	Construction Underway
Α	615	SW 107 Ave, 56 St 40 St	FDOT	Resurfacing			S18	FDOT Const. Yr.'07 - '08
A	615	SW 108 Ave, 40 St - 43 Ln	Fema/Dorm	Drainage			S17	Construction Complete
A	722	SW 107 PI, 166 - 167 Ter	Fema/Dorm	Resurfacing			S24	Arterial (400%)
A	729	SW 136, 92 - 97 Ave	CICC - PW	Sidewalk			Q22	Inspection/Testing Complete (100%)
A A	753	SW 29 St, 77Ct - 78 Ct	Fema/Dorm	Drainage			P16 P16	Construction Complete
	753	SW 29 Ter, 77Ct - 79 Ave	Fema/Dorm	Drainage			P16	Construction Complete
A	753	SW 32 St, 82 Ave - 77 Ave SW 61 Ct - 79 Ave, 74 St - 98 St	Fema/Dorm PW	Drainage Newty David	Nav. 02	New OC		Inspection/Testing Complete (100%)
D D	763 763	SW 81 St - 81 Dr, 78 - 80 Ave	CICC - PW	Newly Paved Sidewalk	Nov 03	Nov 06	P19 P19	
D	763	SW 81 - 86 St, 77 - 87 Ave	CICC - PW	Sidewalk			P19	
D	763	SW 102 St, 87 Ave - 84 Ct.	CICC - PW	Resurfacing			P19	No contract capacity available
D	763	SW 82 - 83 St, 79 - 87 Ave	CICC - PW	Sidewalk		1	P19	Also Drainage in area
D	763	SW 82 - 87 Ave, 88 St - 84 Ter	CICC - PW	Sidewalk			P19	Arterial
D	763	SW 87 - 77 Ave, 72 St - 88 St	PW PW	Resurfacing/QNIP	Apr 05	Apr 08	P19	Scheduled for 1st quarter 2005
D	790	SW 61 Ct - 79 Ave, 72 St - 98 St	PW	Newly Paved	Nov 03	Nov 06	N19	Table 10. Tot quarter 2000
A	802	SW 88 - 104 St, & 77 - 87 Ave	PW	Resurfacing			P20	On Hold By Commissioner
Α	802	SW 61 Ct - 79 Ave, 74 St - 98 St	PW	Newly Paved	Nov 03	Nov 06	P20	,
В	803	SW 88 - 104 St, & 77 - 87 Ave	PW	Resurfacing			P20	On Hold By Commissioner
В	803	SW 79 Ave, SW 100 St - 104 St	PW	Newly Paved	Mar 03	Mar 06	P20	
В	803	SW 79 Ave, SW 101 St - 104 St	CICC - PW	Resurfacing			P20	Construction Complete
В	803	SW 102 St, 82 - 80 Ave	CICC - PW	Drainage			P20	Construction Complete
Α	813	SW 32 - 24 St, 87 - 92 Ave	CICC - PW	Drainage			Q16	
Α	813	SW 32 - 24 St, 87 - 92 Ave	CICC - PW	Sidewalk			Q16	Construction Complete
Α	813	SW 25 St, 87 - 92 Ave	Fema/Dorm	Drainage			Q16	
Α	823	SW 104 St, 89 - 104 Ave	CICC - PW	Sidewalk			R20	Inspection/Testing Complete (100%)
D	829	Kendall Dr. Mills Dr - SW 102 Ave	FDOT	Milling & Resurfacing			R20	Estimated Start Date August 2006
D	829	Kendall Dr. SW 77 - 117 Ave	FDOT	Pedestrian Satety Imp.			R21	FDOT Const. Yr. '05-'07
D	829	SW 88 St, 77 - 117 Ave	FDOT	Pedestrian Satety Imp.			R20	Est. Start Date, August '06
Α	880	11640 SW 128 Ct	PW	Drainage			U21	Construction Complete
В	1004	SW 292 St, 157 Ave - 158 Ave	MDWASD	New Force Main			X32	In design, const. in 2009
Α	1031	SW 187 Ave, 357 - 360 St.	Fema/Dorm	Moderate damage			Z36	Inspection/Testing Complete (100%)
Α	1063	SW 184 - 190 St, & 80 - 97 Ave	PW	Newly Paved	April 03	April 06	Q26	Inspection/Testing Completed

New Conflicts

Inspection and Testing Complete or Ongoing

В

Ready, needs review Pending Rain Event

No Signature, Low Peaking Factor

Figure 4-10

Typical Monthly Conflict Verification Status Report

4.6 Work Force Area Identification Program

Under the Miami-Dade County Workforce Program Ordinance, contractors performing work in certain areas are required to hire a percentage of their workforce from the local area. The CLIP work was unique since the inspection and repair work was countywide and not concentrated in a specific area. In order to implement the program, the various basin repairs had to be identified according to specific work force areas highlighted by the County program.

Table 4.7 is a listing of each Commission District associated with the CLIP work areas. This list was to be used to confirm that the ordinance was complied with during the construction phase of the Program.

Table 4.7
Work Force Areas

	WORTOR	o Alcus	
	Commission		Commission
Basin	District	Basin	District
35	3	564	9
47	3	564	10
58	3	577	8
70	7	603	8
80	7	608	9
82	7	615	10
118	12	681	9
126	12	708	8
154	12	722	9
162	12	729	9
194	12	753	10
195	12	763	10
350	1	790	10
350	4	802	8
355	13	803	8
358	1	813	10
364	1	823	8
378	1	828	8
380	12	829	8
405	12	851	11
410	12	880	9
479	12	885	8
484	12	885	9
509	10	1004	8
524	8	1031	9
525	8	1063	8

It was subsequently determined that the ordinance would not apply to the Program inspection or repair activities.



Section 5.0 Program Tools

Three basic Program tools were developed and maintained to facilitate the CLIP. These were the:

- Hydrograph Development Program
- Work Order Program
- CLIP Database Program

Each of these programs are described below:

5.1 Hydrograph Development Program

Hydrographs are graphs of collection basin flows over time. They are used to evaluate the flow characteristics of the collection system during both dry and wet weather periods and are specifically used in the CLIP for determining the effectiveness of the Program.

Collection system flow components consist of the wastewater flow component, system infiltration from sewer defects below the normal groundwater table and rainfall induced inflow and additional infiltration due to an elevated groundwater table during a rain event (RDII).

Since the daily wastewater flow component is considered relatively constant throughout the Program, basin flows are impacted by two conditions: the amount of rainfall and the prevailing groundwater elevation. Therefore, hydrographs were developed for each basin and each hydrograph also included local rainfall and groundwater table elevation data.

5.1.1 Data Collection

The following data was required for each CLIP basin for the hydrograph development portion of the Program:

- Basin Flow Data
- Local Rainfall Data
- Local Groundwater Elevation Data

Each of these data sets were obtained from ongoing monitoring programs as described below:

5.0 Program Tools April 2006

Basin Flow Data

These data were obtained from the collection system supervisory control and data acquisition (SCADA) program. The system allowed the calculation of station flows by measuring the wetwell level change over time when the local pump station pumps were not operating. The flow into the station could therefore be calculated by multiplying the pump station wetwell cross-sectional area times the rate of wetwell rise with the pumping units off.

This system provided excellent data during normal operating conditions, however, in some basins flow data was not available during extreme storm events when the pumping units did not shutdown or the system surcharged, impacting the wetwell cross-sectional area.

Local Rainfall Data

The South Florida Water Management District (SFWMD) maintains rainfall monitoring stations throughout Miami-Dade County. The CLIP staff matched the closest rainfall gauge station with each Program basin. Figure 5-1 shows the location of the rain gauges used in the CLIP relative to the basin location. Daily rainfall data is obtained from the SFWMD and downloaded into the CLIP database. Each basin hydrograph was checked to ensure that the rainfall data was consistent with the basin flow data.

Local Groundwater Data

The United States Geological Survey Department (USGS) maintains several groundwater monitoring stations throughout Miami-Dade County. The CLIP staff matched the closest groundwater gauge station with each Program basin. Figure 5-2 shows the location of the groundwater gauges used in the CLIP relative to the CLIP basin locations. Daily groundwater elevation data was obtained from the USGS and downloaded into the CLIP database. Once again, each basin hydrograph was checked to ensure that the groundwater data coincided with the basin flow data.

5.1.2 Hydrograph Review

Hydrographs were developed for each CLIP basin. Historical data were obtained for the past 5 year period to provide background flow data.

Figure 5-3 is a typical hydrograph developed under the Program. The graph shows the basin flow, rainfall and groundwater levels during the past five year period. As shown on the graph, rainfall events raise the groundwater table and increase the collection basin flows to the pump station.

Figure 5-1
Rainfall Gauge Locations





Figure 5-3 Typical Hydrograph



5.0 Program Tools April 2006

The hydrographs were used to quantify system flows before and after lateral repairs were made to quantify the effectiveness of the CLIP. <u>Appendix D</u> contains the hydrographs for each of the CLIP basins and the hydrograph analysis procedure is included in Section 7.

5.2 Work Order Program

Work order systems were developed for both the inspection and repair phases of the Program. The purpose of the work order system was to define the work required of the contractor, to monitor the status of the work, allow the CLIP database to be updated, and provide a written record of the work completed for contractor payment purposes. A work order system was required to keep track of the 9,202 lateral inspection and 1,250 lateral repairs completed under the Program. Work orders were issued to both Department forces and contractors who worked on the Program.

5.2.1 Inspection Work Orders

Figure 5-4 shows a typical lateral inspection work order. Each lateral evaluated under the Program was assigned an inspection work order. Each work order was first filled out by the CLIP office staff. A unique work order number was assigned to each work order form. The work order issued to the contractor contained relative lateral information, whether the contractor was allowed on the private property and the projected unit cost items to be used during the investigation. The field inspector could modify the work order requirements if dictated by field conditions only if the modifications were approved by the Construction Manager. The contractor, inspector and Construction Manager then signed off for the work completed and the work order along with other field data (TV and pressure test logs etc.) were returned to the CLIP office for contractor payment, database updating and repair identification purposes.

5.2.2 Repair Work Orders

Figure 5-5 shows a typical lateral repair work order. Each individual private side lateral repair under the Program was assigned a work order. Each work order was first filled out by the CLIP office staff. A unique work order number was assigned to each lateral requiring repair. The work order issued to the contractor contained lateral information (location, material, depth, configuration, etc.), required work and the projected unit cost items to be used for the repair. The field inspection confirmed the work order information and monitored the construction work. The inspector could modify the work order requirements if dictated by field conditions only if the modification was approved by the Construction Manager. The contractor, inspector and Construction Manager then signed off for the work completed and the work order, along with other field data (TV and pressure test logs, etc.), were returned to the CLIP office for contractor payment and database updating purposes.



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Figure 5-4 Lateral Inspection Work Order



association w							0	ant Ma	
Insp	ection ar						80,000,000,00	act No.	
HS No.	40650		em Own			DE WASD		ractor:	
WO No.	Lo	t No.	Issue	Date	Atlas No.	Basin			Work Allowed ?
							Yes	/ No	
lain Line									
USMH NO.	DSMH NO:	US Depth (f	t) DS De	pth (ft)	Surface Typ	be Length (ft)	Dia. (in)	CD No.	Main Line Material
.ateral/CO	Location	/ Charact	eristics						
LaterallC			os. Code	CO#	1 Located?	CO #2 Located?		Lateral	Address

			Grass		A	sphalt	Con	crete	
Exposed	Lateral	0 to 4 ft	4 to	8 ft	0 to 4 ft	4 to 8 ft	0 to 4 ft	4 to 8 ft	
		\$480°°	\$750	o°° 2	\$850	° \$1,150°	\$8500	\$1,150°	
		(Grass			sphalt		crete	
Clean	Out	0 to 4 ft	4 to	8 ft	0 to 4 ft	4 to 8 ft	0 to 4 ft	4 to 8 ft	THE REAL PROPERTY.
Install		\$5500	, \$82	000	\$900°	\$1,2000	\$900°	\$1,2000	
Install	Sewer	Mair	nline Packer			steral Plug		ug with Rod	
Packer	Plugs	\$135	90	13	\$3	14	\$3°	15	Part of Early
Te	st	\$2°	face Air Test	16	\$2	cker Air Test	\$40	rest with Smoke	Hydrostatic Leakage Test
Clear	ning	From Mainlin	Sower up to	25 ft 20	From Maintine S	Sewer beyond 25 ft per ft	\$200	anch Cleaning	
Video Ins	pection	From Mainlin	ne Sewer up to	25 ft		lewer beyond 25 ft per ft	Surface Launch T	elevision up to 25 ft	Surface Launch Television beyon per ft
		5	\$130	00 23	\$1	24	\$63	25	\$100
Video Ins	pection		ch from House		Easer	nent Area	perL	d in Easement Area	· · · · · · · · · · · · · · · · · · ·
			\$150				\$ 100		
DATE COM	PLETED:				SURVEY	' CD No. :		INDEX:_	
СО	MMENTS	:							
ha Quantit	ies Above	Accurately	Reflect	This	Inspection	n/Test			

Figure 5-5 Lateral Repair Work Order



5.0 Program Tools April 2006

5.3 CLIP Database Program

The CLIP developed a database system to administer the Program. A Microsoft access database program was developed under the initial I/I Program and this program has been maintained by Department Sewer Collection System personnel. A second access database was developed for the CLIP which was compatible with that of the original program.

The CLIP database contains the following information:

- Basin physical data including lateral data
- Lateral investigation status
- Lateral repair status
- Basin hydrograph data

The access database is	ery flexible and allows :	specific Program data to	be identified
and organized for reportir	ng purposes. It was use	d extensively to generate	work orders
and reports on the status	of system components.	The database also has e	extensive ca-
pacity. To date, over	items have been inc	cluded in the database.	



Section 6.0 **Program Administration**

The goal of the Program administration function was to effectively utilize available resources to successfully complete the CLIP within both the required Consent Decree schedule and the allotted budget. Three critical Project components must be continuously monitored and managed to produce a successful project. These are:

- 1. Work Product
- 2. Schedule
- 3. Budget

Each of these components are addressed below:

6.1 Work Product Management

Each phase of the Program was monitored to evaluate production rates and identify problem areas. Once issues are identified they must be quickly resolved in order to allow the Project to progress. An extensive database and reporting system was developed for the Project. Sections 5 and 6 detail these systems.

Various reports were utilized to monitor progress and trend graphs were developed to compare the progress with schedule requirements. Figures 6-1 and 6-2 summarize the overall status of the Project. A monthly Project status report (see Section 6.5), detailed the Program progress each month. Graphs were also developed to monitor progress trends. Figures 6-3 and 6-4 compare task progress with the proposed schedule requirements.

Each work task was reviewed for quality control purposes. Often parallel reports were generated to check statistics used on other reports. In general, reports were continuously reviewed by multiple Program staff to assure the quality of the work product.

The CLIP team met with the Department staff on a weekly basis to review progress and resolve outstanding issues. Weekly contractor meetings were also scheduled to review field issues, monitor progress and coordinate office/field activities.

6.2 Document Control Program

The CLIP Program established a document control system to track incoming and outgoing engineering and construction records which included letters, contracts, work orders,



MIAMI-DADE WATER AND SEWER DEPARTMENT COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)

PROGRAM TASK STATUS

	Quantity	
Item	Actual	Proj. Jan '06
Basin Selected	52	
Latent Defects Completed	3,659	
Laterals in Program	9,202	
Basins with Initial Rainfall Signature (After Aug. '05)	30	
Work Orders Issued	2,256	
Laterals Inspected and/or Tested	1,655	
Lateral Repairs Required (@27% Public Fail Rate)	454	
Basins with Inspection and Testing Completed	9	
Basins with Repairs Completed	0	
Basins with Second Rainfall Signature (Pending)	0	





MIAMI-DADE WATER AND SEWER DEPARTMENT COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)

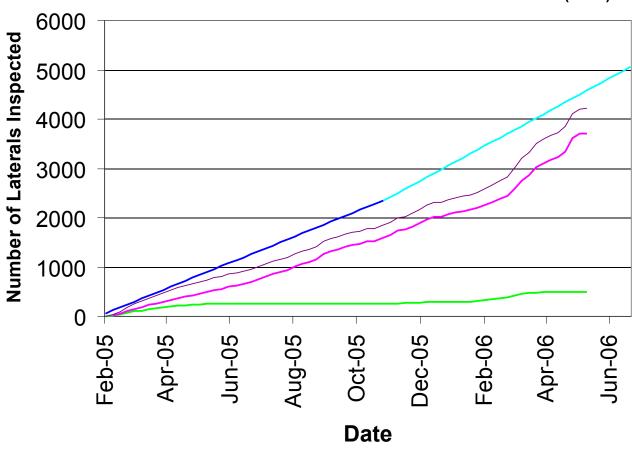
STATUS OF TASKS (September 2005)

Task	Status
Basin Selection	Completed
Database	Ongoing
Hydrograph Development	Ongoing
Latent Defects	Completed
Basins / Inspections	Ongoing
Outreach Program	Ongoing
Work Force Area Program	Ongoing
Conflict Verification Program	Ongoing
Work Order Issuance	Ongoing
Repair Calls	Ongoing
Repair Contract	Awaiting Award





MIAMI-DADE WATER AND SEWER DEPARTMENT COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)



MDWASD

---- ESG

PROJECTED (12/day)

PROJECTED (16/day)

—— COMBINED (MDWASD/ESG)

Figure 6-3 Lateral Inspection Trend Graph



MIAMI-DADE WATER AND SEWER DEPARTMENT COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP) PUBLIC LATERAL REPAIRS (POINT REPAIR/FULL REPLACEMENT)

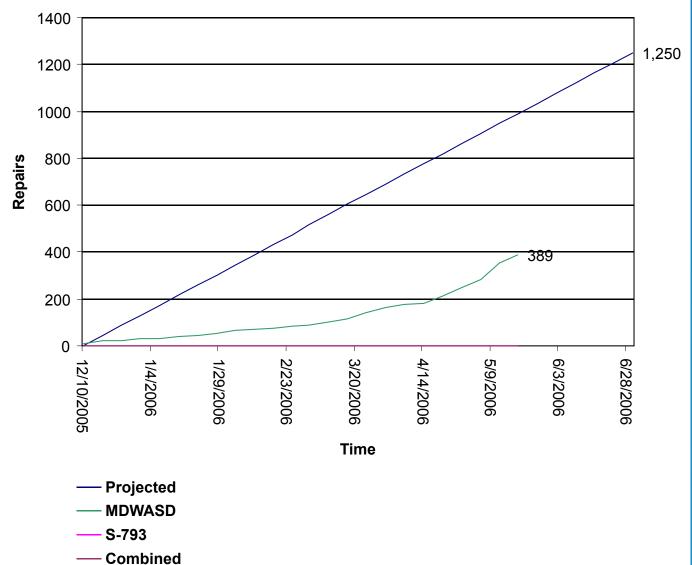


Figure 6-4 Lateral Repair Trend Graph



reports, e-mails, faxes and field pictures. The document control system was standardized to ensure these documents were available and easily accessible to the Program team members. Appendix E is a copy of the Document Control System Index.

All incoming/outgoing communications were processed as follows:

- Documents were stamped in and assigned a unique, sequential Communications Control Number (CCM).
- The document was logged into the document control excel spreadsheet which was part of the CLIP program database.

All documents were stored/retained as follows:

- Each document was photocopied.
- The document was distributed/filed by the unique CCN within each Document Type folder in the files and the CLIP Server for security purposes.

The Document Control Filing System Index was divided into: General File, Engineering File, Bid File, and Construction/Contract File. Each of the categories had sub-divisions and the index was updated as needed.

Maintenance of the Document Control Log was performed on a daily basis, by recording the key information for each project related document or electronic media.

The following are the database fields which facilitated the retrieval of the documents.

- Project Number/Name
- Subject
- Document Type
- Direction
- Document To
- Document From
- Date on Document
- Date Received
- Physical Location

The Document Control log in the database allowed for effective and rapid retrieval of documents by entering key information for the specific document needed.

As of January 6, 2006, there were close to 2,000 documents in the CLIP Log.

6.3 Schedule

Figure 6-5 shows the detailed Master Schedule for the Project. This schedule was updated on a monthly basis and reviewed with The Peak Flow Technical Advisory Committee for the Department. The Consent Decree indirectly requires the CLIP to be complete and a final report issued by February 28, 2007. A goal to complete all repair work for 30 basins by July 2006 was set to accommodate an after rainfall event during the 2006 rainy season.

6.4 Budget and Cost Management

The CLIP had an initial budget of \$17,340,000. Table 6.1 lists the Program budget items, the expenditures to date and the percent budget utilized to date. The table also lists the projected budget expenditure based on the percent of work completed to date. All Program expenditures were below budget and it is anticipated that the overall Program cost will be within the proposed budget.

Table 6.1 Program Budget

Phase 1	Mainline inspections (Work performed by MDWASD) ¹	\$462,192.60
Phase 2	Mainline repairs, manhole repairs, descale and deroot mainline (Work performed by MDWASD and Contractor) ¹	\$952,492.91
Phase 3	Inspection and testing (Work performed by MDWASD) ¹	\$106,018.22
Phase 3	Inspection and testing (Work performed by ESG)	\$1,448,361.00
Manhole seali	ng (Work performed by MDWASD) ¹	\$93,317.34
PM administra	ntion ³	\$1,624,021.44
Consultant (Pe	eak flow and clip meetings / protocol development, etc - under ogram task)	\$254,534.51
	Grand Total	\$4,940,938.02

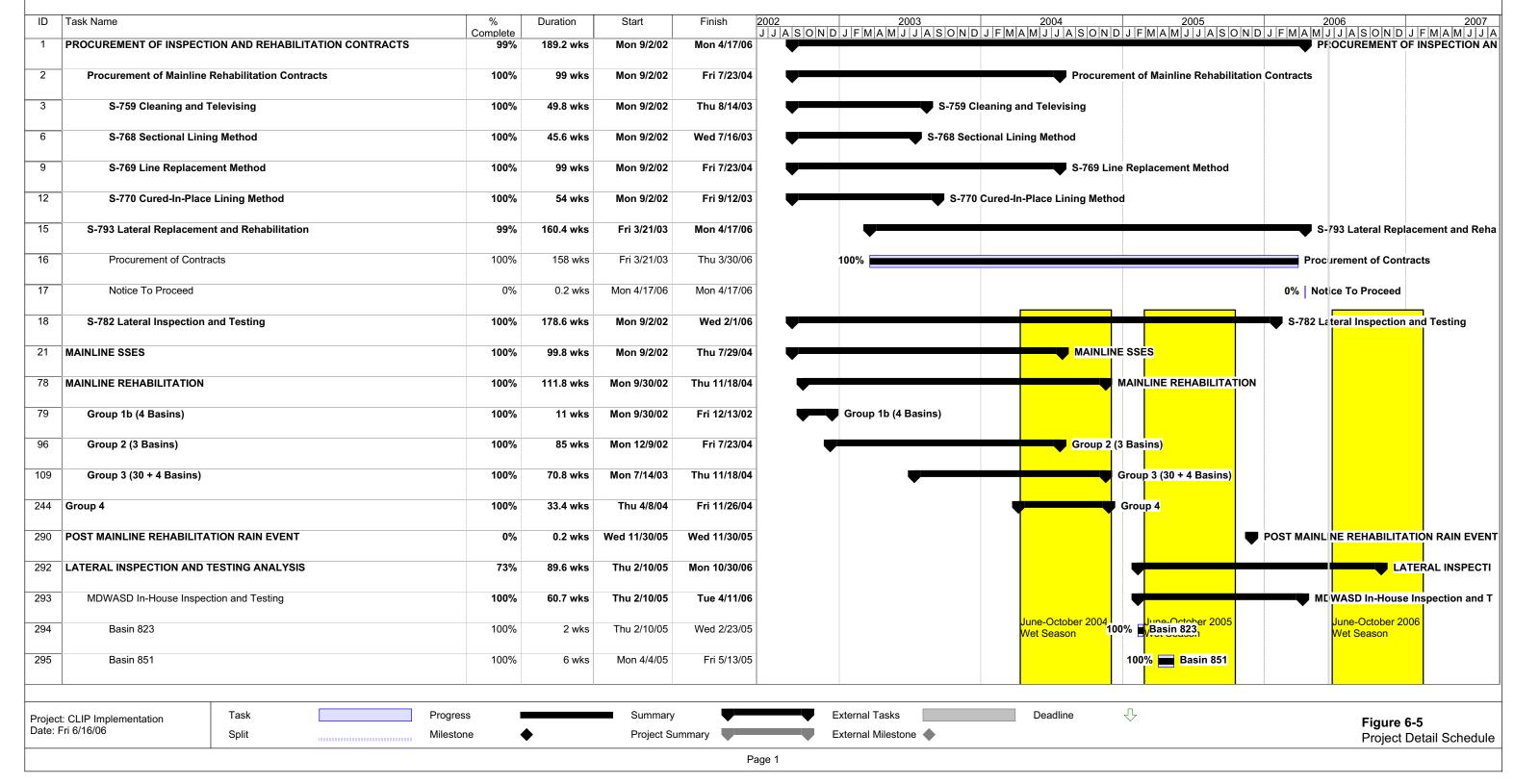
¹ Information as of May 2005.

² Information from clip database as of May 15, 2006.

³ Information as of March 2006.

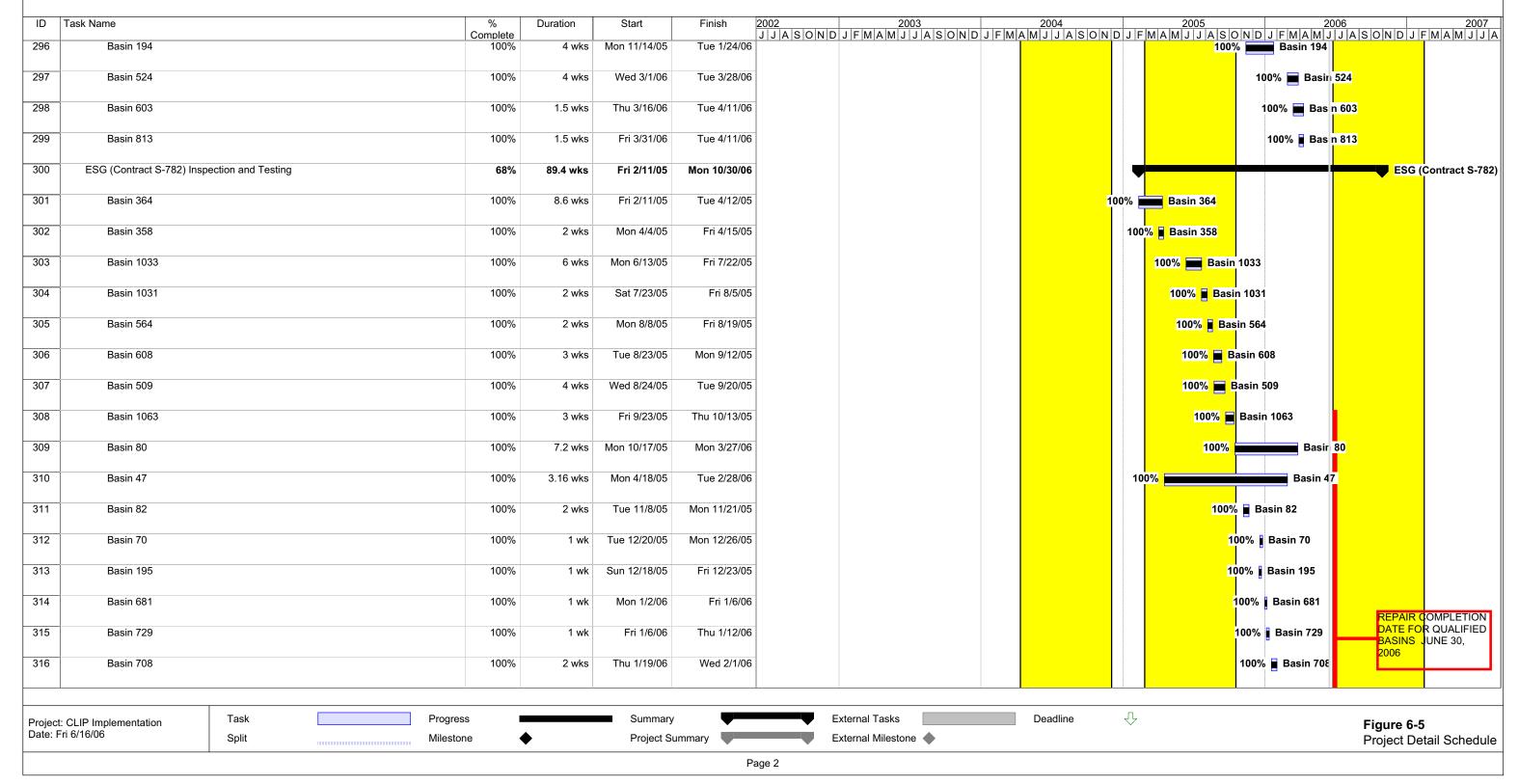












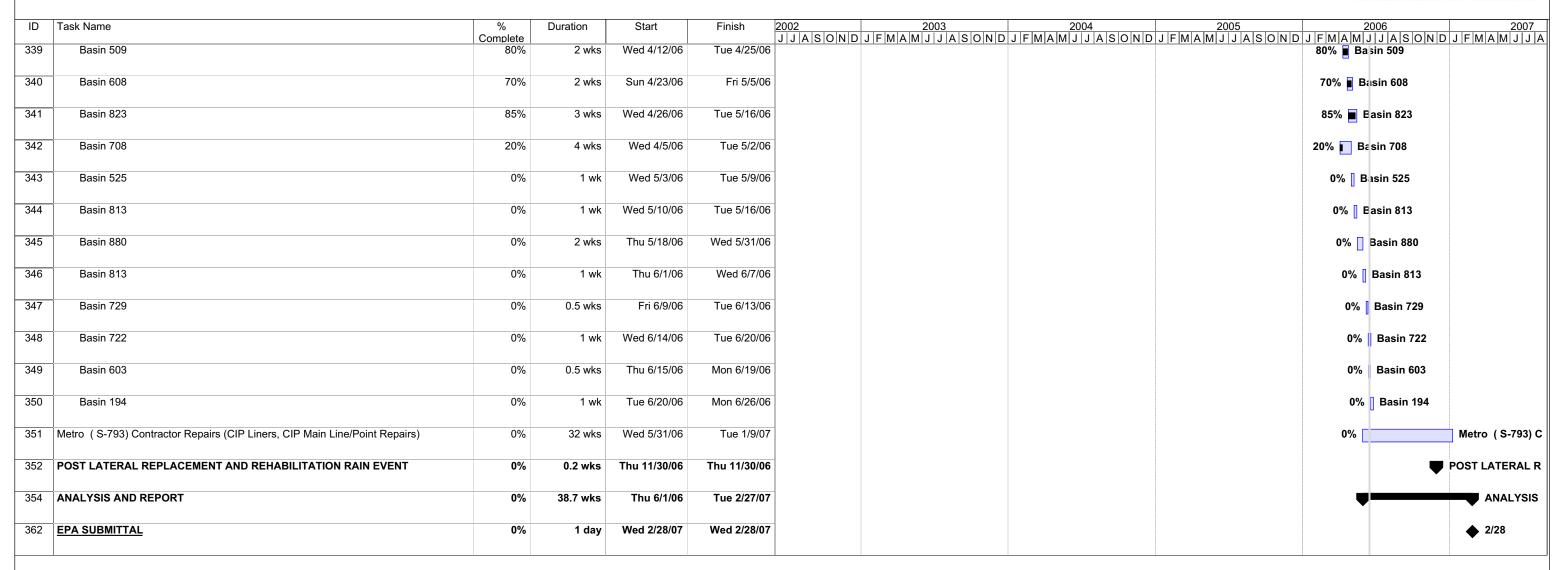












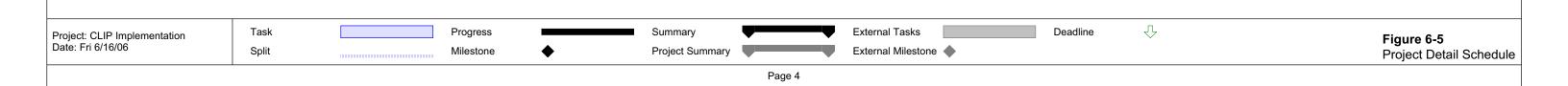


Figure 6-6 is a cash flow trend graph for the program management portion of the Project. The graph shows that the expenditures closely track the new trend line established when the Program was extended by one year.

6.5 Meetings

Periodic Program meetings were required to inform the Department of the Program status and to review outstanding issues. Weekly Program staff meetings were established to coordinate staff activities, review Program status and resolve outstanding issues. Weekly inspection and construction contractor meetings were also required to address field issues.

Special meetings were also called as needed. Department and regulatory special meetings were called to address issues such as the Public Outreach Program, the Road Moratorium Program, and private property repair issues.

6.6 Monthly Status Reports

A monthly CLIP report was generated to document Program status and accomplishments over the period. A copy of a typical status report is included in <u>Appendix F</u>. The report detailed the progress made for all program tasks. It provided a brief description of each task, the status of the task and work accomplished during the monthly period.

6.7 Other Program Reports

Several reports were generated under the program to document basin and lateral physical data, document system conditions, and monitor program status. The access database tracking system allowed for the rolling up of any of the stored information to provide custom reports. Appendix G contains typical reports generated under the program to define field conditions, predict trends, estimate workloads and project costs and provide the status of the various Program components.

Table 6.2 lists typical reports generated in the CLIP and describes their purpose. The CLIP reporting database was a valuable tool which allowed the staff to track all program activities.



MIAMI-DADE WATER AND SEWER DEPARTMENT COMPREHENSIVE LATERAL INVESTIGATION PROGRAM PROGRAM MANAGEMENT EXPENDITURES May 23, 2006



MIAMI-DADE WATER AND SEWER DEPARTMENT COMPREHENSIVE LATERAL INVESTIGATION PROGRAM ESG EXPENDITURES REPORT May 23, 2006

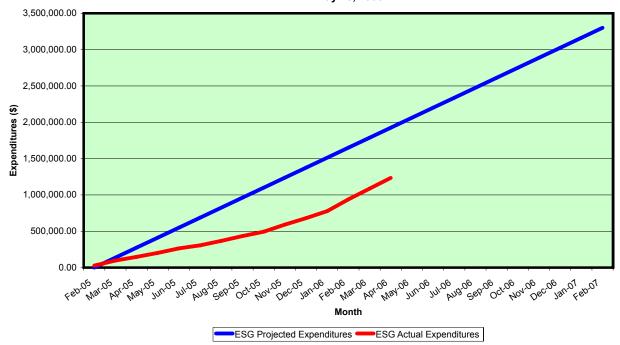


Figure 6-6 Cash Flow Trend Graphs



40650-000R022.cdr

Table 6.2
Typical CLIP Reports

Report Name	Location	Purpose
CLIP Basin RDII Data Report	Appendix G	Reports RDII flows throughout program
Latent Defect Repair Status Report	Appendix G	Track status of lateral defect activities
Latent Defect Summary Report	Appendix G	Summarizes results of lateral defect program
Rainfall/Groundwater Assignment Report	Appendix G	Identifies gauges used for basin hydro- graphs
Qualified Basin Report	Appendix G	Summarizes basin before repair status
Public Outreach Program Status	Section 4.4	Summarize status of Public Outreach Program
Field Inspection Report	Appendix G	Summarizes basin lateral characteristics
Lateral Assignment Analysis Report	Appendix G	Used to assign laterals to inspection contractor
Lateral Inspection Status Report	Appendix G	Lists lateral inspection status by inspection crew
Lateral Inspection Summary Report	Appendix G	Summarizes lateral inspected and CND frequency
Lateral Inspection Bar Chart Report	Appendix G	Shows status of lateral investigation results
CND Summary Report	Appendix G	Summarizes status of investigation of each CND lateral
Basin Inspection Summary Report	Appendix G	Summarizes status of basins
Recommended Repair Report	Appendix G	Lists inspection findings and recommended repairs
Repair Issuance Report	Appendix G	Lists status of repairs issued to crews
Repair Status Report	Appendix G	Lists status of all repair technologies
CLIP Basin Status Report	Appendix G	Gives status of each Program Basin
CLIP Program Status Report	Appendix G	Check list for Program tasks



Section 7.0 Program Analysis

Hydrographs or graphs of basin flows over time were developed for each CLIP basin.
Basin flows during a two year storm event (4.5 inches in 24 hours) were quantified for
storm events before and after the lateral repairs were made. Table 7.1 shows the results of the analysis for each basin. In general, the data indicate the RDII in the CLIP basins was reduced by percent. Based on the 500 RDII basins a similar flow
reduction in each of these basins could reduce the RDII flow by (percent of mgd).
CLIP station characteristics were evaluated to determine if certain characteristics could contribute to the success of the CLIP program. Table 7.2 lists the CLIP stations by percentage RDII reduction and compares their characteristics

7.0 Program Analysis April 2006

Table 7.1

7.0 Program Analysis April 2006

Table 7.2



Section 8.0 Program Costs

The cost of each phase of the CLIP was developed. Table 8.1 lists the Program component and its total cost. A total of \$ was required for the CLIP.
This results in a unit cost of \$ per mgd of RDII removed, which compares favorably to the cost of transmission and treatment facilities estimated at \$ per mgd. It should also be noted that the cost of treatment may well increase with future regulations which may require higher removal rates for high level disinfection or nitrogen reduction criteria.
The 500 high RDII basins have varying RDII flows per lateral and basins with the highest RDII concentrations would be most cost effective to repair. Figure 8-1 is a graph of the RDII per lateral in each of the basins versus 20 year payback period based on treatment and transmission costs.
The graph indicates that based on a 20-year pay back period it would be cost effective to repair of the basins.

8.0 Program Costs April 2006

Table 8.1

40650-000R014F8-1 cdr

Figure 8-1
Basin RDII Results Graph



Section 9.0 Recommendations

Two ongoing Programs will impact the Department's Peak Flow Master Plan: the CLIP and the Pump Station Optimization Program (PSOP). It has been demonstrated that the PSOP is a low cost capital program which greatly reduces RDII flows during two year storm events.

The following procedure is recommended to reduce RDII flows in the collection system:

- 1. The PSOP recommendations be adopted and each pump station be operated under the proposed criteria.
- 2. Review system operations during a 2-year storm event to identify basins with excessive RDII.
- 3 Complete a lateral improvement program on the high RDII basins with a 20-year payback period, giving priority to the basins with highest RDII concentration per lateral.
- 4 Continue to implement a reduced lateral improvement program at a maintenance level as part of the Departments ongoing I/I Program.

The recommended four step program should greatly reduce both RDII flows and system overflows with the lowest capital and O&M expenditure.



Appendix A

CLIP Action Plan





Appendix B

MWH Basin Selection Report





Miami Dade County Water and Sewer Department

Basin Selection for CLIP Pilot

FINAL REPORT – Task 4 March 19, 2004





March 18, 2004 0403037

Howard J. Fallon, Jr., P.E. Miami-Dade Water and Sewer Department 3071 S.W. 38th Avenue Miami, Florida 33146

Task 4 – Basin Selection for CLIP Pilot Final Report Subject:

Dear Mr. Fallon:

MWH is pleased to submit five copies of the Basin Selection for the CLIP Pilot Final Report for Miami Dade Water and Sewer Department (MDWASD). Comments on the draft report submitted in July 2003 were received and have been addressed herein. This submittal represents 100 percent complete of the scope of work.

The preparation of this report has involved the efforts of many individuals. In particular, MWH wishes to acknowledge and express our gratitude to the staff of MDWASD for their assistance and cooperation during the preparation of this report. Additional basins are being evaluated, under separate authorization, to expand the program.

MWH looks forward to working with MDWASD on future projects. Please do not hesitate to contact us if we may be of additional service.

Very truly yours,

MWH

Glenn R. Humphrey

Vice President

Enclosure

cc:

Harold Aiken, MWH/FTL-1 Yurfa Glenny, MWH/FTL-1 MWH Project File 1570720/3.1.2

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Section 1 Introduction and Executive Summary

1.1 BACKGROUND

Following extensive main-line repairs, Miami-Dade Water and Sewer Department's (MDWASD) wastewater system continued to experience high inflow and infiltration (I/I) primarily during rainfall events. This increase in flow during rainfall events is known as Rainfall Dependent Inflow and Infiltration (RDII). Part of this RDII may be resulting from groundwater submerging public and private portions of the sewer laterals (public) and service lines (private) where defects in the laterals and service lines provide for groundwater entry points. Other Utilities have documented RDII reductions following sewer lateral repairs. Since part of the sewer laterals (the service lines) are buried on private property (from street right-of-ways to the home or business connection) making repairs in this private portion of the sewer collection system is problematic for Public Utilities.

To estimate the potential peak flow RDII reductions which may be achieved by repairing laterals, MDWASD conducted a limited study beginning in 2001 where the sewer mains and lateral connections were repaired within pump station basins 116, 191 and 203. The study results were encouraging and helped result in a negotiated Consent Decree time extension with EPA to complete a more extensive lateral pilot study. MDWASD designed the Comprehensive Lateral Investigation Program (CLIP) to include repairs of defective service laterals including where possible, the portions on private property. Additional pump station basins will be selected with varying physical characteristics to evaluate these factors on the volume of peak flow RDII reduction and cost effectiveness of the program. The CLIP action plan was published by MDWASD on October 26, 2001.

1.2 STATEMENT OF PROBLEM

MDWASD operates and maintains approximately 1,000 sewage pump stations servicing the metropolitan area of Miami-Dade County. A systematic approach was needed to select the pump station basins, referred to herein as basins, to be used in the CLIP. The goal for basin selection was to identify a representative sample of basins that allows MDWASD to reasonably quantify peak flow RDII reduction and guide future system wide investigation and rehabilitation criteria.

1.3 SUMMARY OF THE APPROACH

1.3.1 Basin Selection Protocol

The focus of the CLIP is to repair laterals within the gravity sewer system of each pump station basin that receives excessive flows during rainfall events or in other words, has an "RDII signature". During an initial RDII evaluation, a technical advisory committee

determined that a representative group of pump station basins should be evaluated. They estimated that about 30 basins would assure that a variety of characteristics such as land use, soil type and service lateral material would be represented. A protocol was proposed as a tool for selecting the RDII basins for the CLIP. The draft protocol was discussed in a working meeting with MDWASD staff on October 11, 2002 resulting in a final protocol (see **Appendix A**).

1.3.2 Database of Pump Station Basins

After the basin RDII selection protocol was developed a Microsoft AccessTM database was generated to capture the characteristics identified in the protocol for each basin. The database was sorted and queried on parameters indicated in the protocol. Results of the queries provided a rational reduction of the number of basins selected for the CLIP.

1.3.3 Data Evaluation

An important part of the CLIP and RDII determination is evaluating the hydrograph for each pump station. MDWASD has a SCADA system that electronically monitors when the pumps in a pump station operate. Flow through each pump station is calibrated using pump station wet well size and the measured change of the water level in the wet well with time. These computed flows are then plotted on a hydrograph. MDWASD hydrographs indicate flow into a pump station and currently are only based on wet well size and level change vs. time. Pump curve data and system pressure are not currently used by MDWASD for hydrograph development. These hydrographs can then be used to determine if a pump station has an RDII signature and further evaluated as part of the CLIP.

1.3.4 Basin Selection

Ten basins were selected for inclusion in the CLIP prior to the preparation of the selection protocol. Three of these basins were used for the initial lateral pilot and are referred to as Group 1a (116, 191, 203). The other seven basins are referred to as Groups 1b, (47, 118, 763 and 851) and 2 (35, 615 and 1004). The basins selected through the protocol process are referred to as Group 3.

1.4 OTHER DATABASE USES

The RDII Database can also be used to identify basins for additional repairs, additional basins for lateral repairs, prioritization of basins, and to review existing information. A list and a figure of all of the basins selected for the CLIP is provided in **Appendix B**.

Section 2 Basin Selection Protocol Development

2.1 BASIN SELECTION PROTOCOL DEVELOPMENT DETAILS

The October 2002 CLIP Basin Selection Protocol was written to provide a systematic approach to reduce Miami-Dade's total number of approximately 1,000 basins to a manageable number for the Comprehensive Lateral Investigation Program (CLIP). The goal is to study the gravity service area for about 30 pump station basins referred to herein as basins. The CLIP Selection Protocol can also be used to prioritize future basins selected for lateral repair if the pilot program proves effective and is expanded. The CLIP Selection protocol is provided in **Appendix A**. A CLIP Selection flow chart is provided in **Figure 2-1**.

MDWASD requested that the following criteria be considered to select the basins and to include these items in the protocol:

- Rainfall Dependent inflow and infiltration (RDII)
- Peaking Factor
- Basin Size
- Basin Age
- Basin Location

2.2 HYDROGRAPHS

The hydrographic response is the primary tool used to evaluate the impact of rainfall on a pump station. Therefore, the majority of the protocol addresses the generation and evaluation of hydrographs.

Hydrographs are generated with data collected by MDWASD's Supervisory Control and Data Acquisition (SCADA) system, which electronically monitors when the pumps in a pump station operate. Using information about the change in water elevation within the wet well over time and the wet well cross-section; the flow into the pump station is plotted on a chart with time on the horizontal axis and flow on the vertical axis. An example of a hydrograph is shown in **Figure 2-2**.

2.2.1 Generating Hydrographs

The first step in developing the protocol was determining conditions for evaluating the pump station's performance. The primary goal of the CLIP is to reduce the amount of RDII flow that is pumped and treated during rainfall events that produce approximately 4.5 inches of rain during a 24-hour period. In a Consent Decree with the Environmental Protection Agency (EPA), MDWASD agreed to meet several

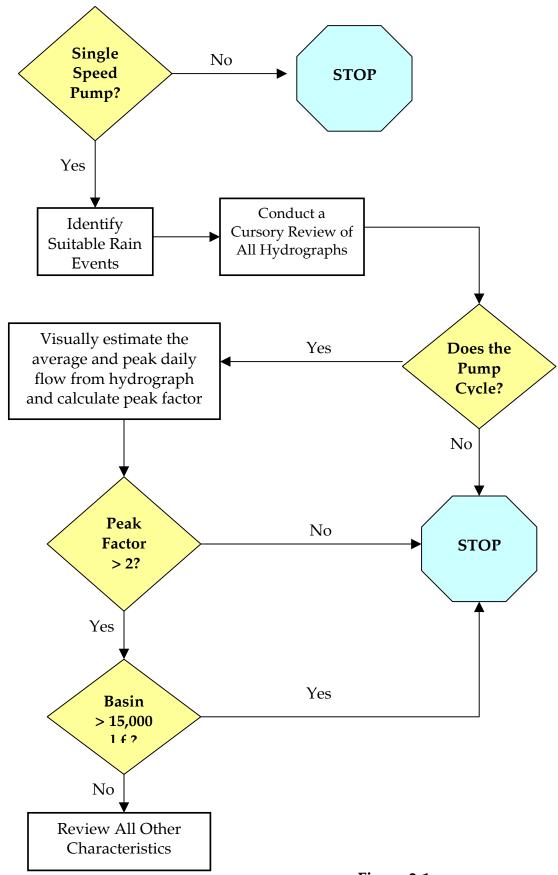
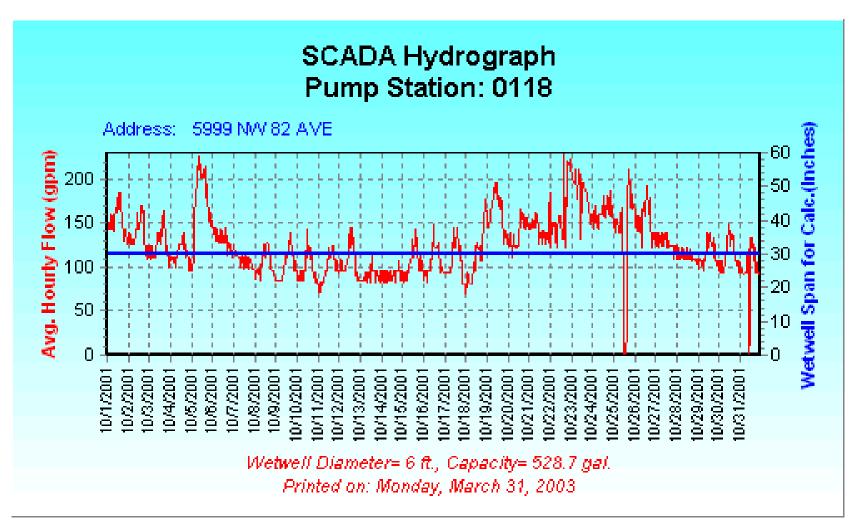


Figure 2-1
CLIP Basin Selection Protocol Flow Sheet

Figure 2-2 Hydrograph



performance standards for their pump stations during these rainfall events. For the Miami-Dade area, such rain events have a statistical return frequency every 2 years.

The hydrograph can be used to determine if a pump station is affected by RDII. Hydrographs will be generated for similar rainfall events for each basin selected for the CLIP. These hydrographs will be evaluated for rain events before and after repairs to the mainlines and laterals are made to gauge the effectiveness in reducing the overall RDII response.

Based on this information, the decision was made to evaluate the pump station performance during a 4.5 inch rainfall received in a 24-hour period or a similar rainfall intensity. The protocol requires a user to generate hydrographs for a timeframe that brackets these events. Some alternate rainfall intensities include:

- 4 inches of rain during a 24-hour period
- 5 inches of rain during a 72-hour period
- 6 inches of rain during a 72-hour period

Accurate hydrographs can not always be generated. The computer program is unable to convert run times to flow if the pumps are multi-speed pumps. Additionally, when the pumps operate continuously or if all pumps operate, the hydrograph is either not accurate or the data is not generated properly. Therefore, the protocol requires a user to eliminate basins with multi-speed pumps and pumps that operated continuously throughout the rain event.

2.2.2 Interpreting Hydrographs

The next step in the protocol is to conduct a thorough review of the hydrographs. A user can read the hydrograph and estimate the pump station average flow prior to or after a rain event and the daily peak flow that occurred during a rain event. Once the rain induced peak daily flow and average flow are determined, a peaking factor is calculated by dividing the peak flow by the average flow.

2.2.3 "Signature Criteria"

After developing data from the hydrographs, the next step in the protocol is to limit the stations to those with an RDII signature. MDWASD has regional wastewater plants, each designed to treat daily peak flows approximately two times their average capacity, thus, a pump station with a peak factor above two for the design storm is identified as having an RDII signature.

2.2.4 Re-Pump Stations

Some of MDWASD's pump stations receive flow from other pump stations as well as their own gravity system. These stations are referred to as re-pump stations in this report. The RDII signature concept is to evaluate the performance of a pump station gravity system during the rainfall event. Therefore, flow contributed to a re-pump station from another pump station must be subtracted from the re-pump station hydrograph to provide meaningful information. Steps for evaluating re-pump stations are included in the Protocol, but using re-pump stations was not preferred.

2.3 PUMP STATION CHARACTERISTICS

Once information is obtained from the hydrographs and the list of basins has been reduced to those with an RDII signature, additional factors are considered. In the CLIP plan, MDWASD agreed to select basins with a variety of characteristics. The plan is to evaluate the effect of a variety of characteristics on the reduction of RDII to determine which characteristics have more or less of an impact on the success of the repairs.

2.3.1 Number of Laterals per Basin

In order to make the CLIP manageable, MDWASD staff requested that the pump station basins be reduced to those with less than 15,000 linear feet of main line sewer piping. Logically, smaller basins will usually have fewer lateral connections needing repair.

2.3.2 Basin Location

The basin location is expected to have an affect on the success of the CLIP. The protocol includes the consideration of various location factors such as north, central, south, east or west orientation, proximity to a wellfield protection zone and proximity to surface water bodies. Factors that will vary by location include soil type, land elevation, depth to ground water, ground water flow direction, tidal influences, land use, zoning, population density and age of development.

2.3.3 Lateral Age

This parameter is an important factor in the evaluation of the CLIP results. The lateral age is related to the material used to construct the lateral. Older laterals are more likely to be constructed of Orangeburg, Vitrified Clay or Cast Iron whereas newer laterals are likely to be constructed of Polyvinyl Chloride (PVC). Orangeburg and Vitrified Clay piping are much more prone to defects because of material deterioration, joint inadequacy, and brittleness. Orangeburg pipe is comprised of cellulose fibers impregnated with hot coaltar pitch. The joints are gasketless. The pipe often softens and deforms with age, allowing infiltration and root intrusion. Two varieties of Orangeburg pipe exist: one with solid (homogeneous) walls and one with laminated

walls. Vitrified clay pipe, manufactured from fired clay, is susceptible to cracks and breakage due to differential settlement and inappropriate structural loading. These pipe material were widely used in house laterals for over 70 years, until PVC won wide acceptance in the industry.

2.3.4 Zoning and Land Use

This parameter is also specifically noted in the CLIP protocol. The type of zoning will have an impact on the number and length of each lateral. Residential zoning will have a greater number of short laterals. In commercial or industrial zoned areas, buildings are typically larger and spaced further apart and are often located further from the right-of-way boundary, resulting in fewer, but longer laterals as compared to residential areas.

2.3.5 Other Factors

Other protocol criteria included: the population within a basin, the Nominal Average Pump Operation Time (NAPOT), night time flow and weekly flow patterns. Once the number of pump station basins has been reduced using the protocol, it was anticipated that these factors may impact the final selection for the CLIP.

Section 3 RDII Database Development

3.1 IMPLEMENTING THE PROTOCOL

To streamline the implementation of the October 2002 CLIP Basin Selection Protocol, a Microsoft AccessTM database was developed to store and rank information about each basin. This database, called the MDWASD RDII Database, was used to create a list of suitable basins.

3.2 GENERATING HYDROGRAPHS

The first step in the protocol is to generate hydrographs for a two year rain event (4.5 inches of rain in 24 hours) or a similar event.

3.2.1 Rainfall Events

Rain events were evaluated from 1998 to 2002. Two appropriate rain events were identified and both occurred in 2001. Approximately 7.9 inches of rain was measured at the Miami International Airport (MIA) on September 27 to September 29, 2001 and approximately 4.7 inches of rain was measured at MIA over 24 hours on October 21, 2001. The decision was made to obtain September and October 2001 hydrographs to bracket each rainfall event. The rainfall information and hydrograph request was submitted to MDWASD in a memo dated September 30, 2002.

3.2.2 Suitable Data

A hydrograph was generated for each pump station for the September 2001 rainfall event and given a cursory review to determine if the data quality allowed for interpretation. About one-third of the hydrographs appeared to have been generated with suitable data. The remaining charts had no data for the day of the rainfall event or showed a data anomaly such as extreme spikes or flat lines. This information is documented in a memorandum dated July 10, 2002 to MDWASD. October 2001 hydrographs were generated for those pump stations with usable data from the September 2001 hydrographs.

3.3 INTERPRETING HYDROGRAPHS

The amount of data that is used to generate hydrographs for 1,000 pump stations is too large to transfer electronically or to utilize with traditional computer programs such as Microsoft ExcelTM. MDWASD is using a computer program that allows them to mass produce and print hydrographs, but does not allow for the transfer and evaluation of the raw data. These hydrographs are adequate for the purpose of selecting basins but it requires a person to visually estimate data from a printed chart.

All of the SCADA hydrographs were reviewed in accordance with the protocol. An average flow was visually estimated for each pump station during the days prior to the rainfall event and when not affected by other rainfall. A daily peak flow was visually estimated for the timeframe during and immediately following the rainfall event. These results were entered into an ExcelTM spreadsheet called *Hydrograph Evaluation*.

The peak flow for each rainfall event and each pump station was calculated by dividing the average peak flow by the average flow. ExcelTM was also used to calculate if the pump station displayed an RDII signature for each rainfall event and both events.

The *Hydrograph Evaluation* spreadsheet was imported and linked in AccessTM. This provides the user with an efficient way to compare and sort the data with AccessTM and use the data with ExcelTM to generate charts and perform calculations. Modifications are made to the ExcelTM spreadsheet which automatically updates the AccessTM database.

3.3.1 Determining Average Flow

Generally the flows occurring prior to the rain event were used to determine the average flow because it typically takes hours and sometimes days for a pump station flow to return to average after a rain event. Some of the pump stations had a data pattern indicating the flows differ on the weekday verses the weekend. This is particularly true for basins in areas zoned for commercial or industrial use. For these basins, the day of the week that the rain event occurred was identified. If the rain event occurred on a weekend, only the weekend flow prior to the storm was used to determine the average flow.

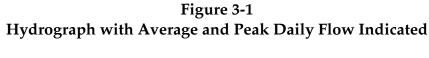
3.3.2 Determining Peak Flow

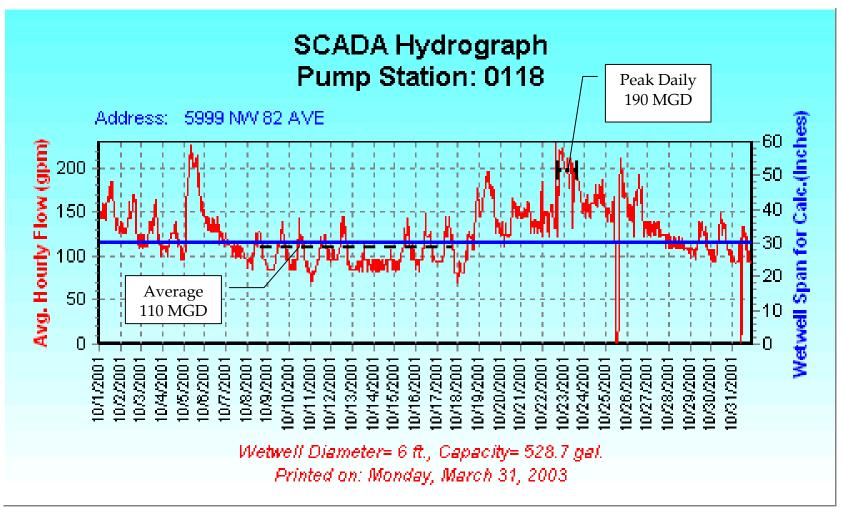
Generally, the hydrographs spiked on the day of the rain event. The protocol requires the determination of the peak daily flow, not a peak instantaneous flow. Therefore, the reviewer estimated an average flow from the maximum portion of the flow spike spanning a 24-hour period from the hydrograph. **Figure 3-1** contains a hydrograph with the average and average peak flow identified.

3.3.3 Data Corrections

The flow data entered into the *Hydrograph Evaluation* spreadsheet was evaluated for errors. The October 2001 peaking factor was subtracted from the September 2001 peaking factor. All peaking factors that differed by 1.0 or more were reviewed for a second time.

During this process, it was discovered that the timing of the two rainfall events was causing a problem with estimating the average flow and resulting in a variable peak





factor. The September and October hydrographs were evaluated separately. The average flow was estimated from the graph prior to the rainfall event.

For nine of the pump stations, the October 2001 average flow prior to the storm was greater than the September 2001 average flow, but the peak flow during both flows was not much different. The difference in the average flow reading occurred because these pump stations did not recover after the first rainfall event before the second occurred. The result was a lower peak factor for the October 2001 rainfall event. These errors were corrected by setting the average flow for October 2001 as equal to the September 2001 average flow. **Table 3-1** summarizes the pump stations that were corrected in this manner.

Table 3-1
Pump Stations with Slow Recovery

Pump Station	09/01 Average Flow (gpm)	Initial 10/01 Average Flow (gpm)	Corrected 10/01 Flow (gpm)
115	70	400	70
116	14	29	14
191	19	70	19
194	35	90	35
336	12	40	12
481	6	15	6
729	13	20	13
813	18	14	18

A second problem identified during this process is related to the span used to calculate the flow on the hydrograph. For some of the pump stations, the two hydrographs were generated using different spans. In addition, at least twenty pump stations did not have the span indicated on one of the hydrographs. Eighteen of the pump stations with hydrographs calculated using different spans were selected for the CLIP.

When the span is changed on the hydrograph, it changes the scale and the estimated average and peak flow. Since both flows will change at the same incremental rate, the peak factor is still a true number. To ensure the raw data is comparable for each pump station, the hydrographs should be generated using the same span, and the span information should be indicated on the hydrograph. Details about the pump stations with different spans or missing information are provided in **Appendix C.**

3.3.4 Re-Pump Stations

The CLIP Selection Protocol calls for the identification of re-pump stations. To determine if a pump station qualifies as a re-pump station, MWH utilized two AccessTM databases provided by MDWASD. One AccessTM database called *Upstream PS List* contains a list of all pump stations and any upstream pump stations and its upstream level. The other database called *tblUpstreamPaths* provided the wastewater plant and all pump stations including re-pump stations in tabular form.

The *Upstream PS List* database was modified slightly to make it easier to filter for those pump stations that were re-pumping flow. The re-pump station numbers were entered into the UpStream column and a zero was entered into the UpstreamLev column. This allows an AccessTM user to filter or query on the UpStream column for all records that contain data which also have a zero in the Upstream Lev column. This filter or query will return all re-pump stations.

The *Re-Pump Query* was developed with the *Upstream PS List* using the method previously described. The query was created to show all pump stations and to identify those that re-pumped flow. A calculating column was added in the query which returns either a Yes or No display indicating if the pump station re-pumps flow. This query is used in the other queries to avoid creating a duplicate field in the *RDII Database*. A query was created to merge the *RDII Database* table with *the Re-Pump Query* entitled *RDII Database and Re-Pump*.

While reviewing the re-pump station databases it was observed that several pump stations were shown as re-pump stations even though they were no longer operating in this manner. Additional reviews were conducted on the database and corrections were made. **Appendix C** contains details about the corrections.

3.4 PUMP STATION CHARACTERISTICS

Once the information is obtained from the hydrographs and the list of pump station basins has been reduced to those with an RDII signature, additional factors are considered. In the CLIP plan, MDWASD agreed to select basins with a variety of characteristics. This will allow them to study the effect of these characteristics on the reduction of RDII to determine which have more or less of an impact on the success of the repairs. These characteristics were entered into several tables within the RDII AccessTM database. Using a variety of basin selections also allows representation of the entire MDWASD system. The following sections provide additional details about the characteristic data.

3.4.1 Basin Size

MWH obtained basin size data from MDWASD in an AccessTM table along with night flow information. MWH added this table into the MDWASD RDII Database and named

it *Basin Characteristics*. The information in the table was not evaluated for accuracy or altered.

3.4.2 Basin Location

MWH created an AccessTM table called *RDII Database* to store the characteristics indicated in the protocol that was not found in other AccessTM tables.

The CLIP Selection Protocol requires the identification of each basin location. Three fields were created in the *RDII Database* table to capture information about the proximity of each lift station that could be sorted and evaluated. Conditions were entered to limit the data that could be entered for consistency. One field indicates if the pump station is generally located in the Northern, Central or Southern section of the County. The second field indicates if the basin is generally located East or West of US-1. The third field indicates if the basin is located in a wellfield protection area.

The North, Central or South field is designed so a user may only enter a "N" for North, "C" for Central, "S" for South. If a pump station is north of NW 58th Street, Hialeah Drive or NW 54th Street, the value "N" should be entered in the field. If the pump station is south of SW 136th Street, the value "S" should be entered in the field. All other stations should be entered as "C" for Central. A map of the pump stations was used to determine the correct value for each station.

The East or West field is a "Yes/No" data type, but the results will appear as either East or West. The default value is No or West. If a pump station is east of US-1, a user should change West to East. Using their GIS data, MDWASD generated a list of Stations that were located east of US-1 for MWH to use to enter the data in the table.

The Wellfield Protection Area field is also a "Yes/No" data type with a default value of No. MDWASD provided MWH with a list of pump stations located in a wellfield protection area.

The CLIP Selection Protocol required the identification of pump station basins near water bodies. MWH attempted to create a "Yes/No" field in the *RDII Database* table to indicate if a pump station is adjacent to a body of water. The information that could be generated from MDWASD GIS data was investigated. It was determined that a list of pump station basins located within a specified distance from a water body could not be obtained. Using a map provided by MDWASD, MWH visually located pump stations that appeared to be adjacent water bodies. However, while reviewing the results, it was determined that the data was too arbitrary since there was no distance or water body criteria. For example, a list of criteria such as size and depth had not been established to define as a water body. Therefore, this field was removed from the *RDII Database* table.

3.4.3 Private Service Lateral Age

The private service lateral age is an important characteristic identified within the CLIP Selection Protocol. A field was created in the *RDII Database* table to capture information about the approximate age of the laterals within the pump station basin. Using a map of the pump station basins and the Miami-Dade County Property Appraiser's website, the average construction age of the buildings within the basin was estimated and entered into the table. There are limitations to this approach. Some of the older structures may have had their service lateral replaced. When a pump station basin was found to have a majority of buildings built prior to 1945, the lateral age field was left blank.

3.4.4 Lateral Zoning

A field was created in the *RDII Database* table to capture information about the average zoning characteristics for the property within each pump station basin. Using a map of the basins and the Miami-Dade County Property Appraiser's website, the zoning characteristic was estimated.

In order to allow a user to sort for zoning characteristics, the data entry of the zoning description was standardized. Where several characteristics were found in one basin, all characteristics were listed in order of estimated prevalence. The total list of characteristics provided by the Property Appraiser was also reduced to make data entry and comparison more manageable. The term Commercial was used for both Commercial and Industrial zoned areas since both generally indicate larger buildings with longer laterals. The term Multi-Family was used as a general term to include townhouses, condominiums and similar structures. The term Single Family was used for both single family homes and estates. **Table 3-2** provides the list of standardized zoning descriptions.

Table 3-2
Standardized Zoning Descriptions for Data Entry

Standard Zoning Descriptions					
Commercial					
Commercial / Government					
Commercial / Multi-Family					
Commercial / Single Family					
Government					
Multi-Family					
Multi-Family / Commercial					
Multi-Family / Commercial / Government					
Multi-Family / Government					

Standard Zoning Descriptions					
Multi-Family / Single Family					
Multi-Family / Single Family / Commercial					
Single Family					
Single Family / Commercial					
Single Family / Commercial / Multi-Family					
Single Family / Multi-Family					
Single Family / Multi-Family / Commercial					
Single Family / Multi-Family / Government					

3.4.5 Other Factors

Information about the piping material or population was not available for each basin. Therefore, these fields were left blank in the *RDII Database*.

3.5 SELECTION PROCESS

After the tables and queries were created, the data was sorted and filtered to generate a short list of basins with less than 15,000 linear feet. The query is called *RDII* < 15000 feet and provides a short list of 54 basins and their characteristics. A working group reviewed the short list and reduced it from 54 basins to a final list of 34 basins. The following information describes the process used to reduce the short list. A list of all the basins selected for the CLIP is provided in **Appendix B**.

3.5.1 Small Basins

Three of the basins on the short list had less than 1,300 linear feet of gravity collection sewers and a low average daily flow. These small basins had hydrographs which were difficult to interpret. The working group agreed these basins should not be selected for the CLIP.

3.5.2 Hydrograph Data

Accurate hydrographs are required to analyze the CLIP results. The September and October 2001 hydrographs show the baseline conditions for each selected basin prior to lateral improvements. Therefore the hydrograph quality was deemed the most important consideration in its selection for inclusion in the CLIP. The working group agreed that basins with questionable hydrographs should not be selected for the CLIP.

At the time this project was being conducted, MDWASD was mass producing hydrographs from a computer program with limited capabilities. Hydrographs with erratic data would have to be corrected with a different computer program on an individual basis. Therefore, the working group wanted to avoid basins with problematic hydrographs.

The SCADA for six of the pump station basins generated hydrographs that were difficult to read or had questionable data. Some of the hydrographs had peak flow spikes so intense that it skewed the scale making it difficult to read the average flow. For example, a pump station with an average flow of 10 gpm was plotted on a chart with flow ranging from 0 to 1,000 gpm because of one erratic spike. These pump stations were removed from the final list.

3.5.3 RDII Signature

After the small basins and basins with questionable hydrographs were removed from the list, the remaining basins were evaluated. In addition to reviewing their hydrographs for both rainfall events; the pump station basin characteristics, night flows and NAPOT data was also reviewed. Ultimately, the quality of the hydrograph and its RDII signature generally determined if a basin remained on the final list.

Seven of the pump station basins had hydrographs that indicated the RDII duration was not severe or the station appeared to have an I/I problem but not an RDII signature. These basins were considered low priority and would remain on the list only if 30 pump station basins with an obvious RDII signature could not be identified. Once the review was complete, the final list had greater than 30 stations, so the low priority stations were completely removed prior to submittal. **Table 3-3** provides information about the 20 pump station basins that were removed from the short list.

Table 3-3
Pump Stations Removed from Short List

Basin Number	Basin Footage (lf)	9/01 Peak Factor	10/01 Peak Factor	Notes
70	507	23.0	3.0	Basin size is too small
82	4,906	20.0	8.8	Hydrograph problems with spikes
90	5,915	2.1	3.4	Hydrograph shows RDII is moderate
180	3,767	5.8	8.4	Hydrograph shows RDII is a low priority, has a quick spike
P. s.i.s.	Basin	9/01	10/01	
Basin Number	Footage	Peak	Peak	Notes
Number	(lf)	Factor	Factor	
222	38	2.1	2.0	Basin size is too Small
322	4,083	2.1	3.3	Hydrograph shows RDII is a low priority, has a quick spike
371	14,611	3.8	2.7	Poor hydrograph data
381	8,086	2.8	3.0	Hydrograph shows RDII is a low priority
400	2,153	4.6	2.2	Hydrograph shows RDII is a low priority
407	8,412	2.4	2.0	Hydrograph indicates an in-flow problem

Basin Number	Basin Footage (lf)	9/01 Peak Factor	10/01 Peak Factor	Notes
481	4,441	9.5	15.0	Poor Hydrograph
567	6,434	2.9	3.6	Wellfield Protection Area, hydrograph problem with span or scale
585	5,958	4.3	2.2	Wellfield Protection Area, poor hydrograph data
1012	5,904	2.9	4.7	Hydrographs indicate an I/I problem, not an RDII problem
1085	1,211	3.2	4.5	Wellfield Protection Area, Basin size is too small

3.6 PREVIOUSLY SELECTED BASINS

Ten basins were selected prior to the development and use of the protocol and AccessTM database. Six additional basins were selected before the AccessTM database was complete. The selection criteria used to identify these basins are described below.

3.6.1 Group 1 and 2 CLIP Basins

MDWASD began the CLIP program in 1999. To select the initial basins, referred to as Group 1 and 2, a "5-year", 72-hour rainfall event, which occurred September 16 through 18, 1998, was identified for study. Pump stations were selected for the CLIP if the September 1998 hydrograph showed a RDII signature and the pump station did not repump flow, had a small basin size, discharged to a gravity system and had adequate SCADA data. "RDII Signature" is defined as a peak factor of 2.0 or greater in a two year storm event.

Table 3-4 provides information about these basins:

Table 3-4
Pump Stations Selected for Phase I Pilot Study

Pump Station No.	Group	Pending Repairs	Basin Footage (lf)	No. of Laterals	09/01 Peak Factor	10/01 Peak Factor	RDII Signature
35	2	Mainline Contractor	4,367		2.1	1.4	N
47	1b	private laterals	13,648		graph cuts off	data problem	Y
116	1a	private laterals	1,548	12	8.6	11.9	Y
118	1b	private laterals				1.8	N
191	1a	private laterals	6,958	68	14.2	16.8	Y

Pump Station No.	Group	Pending Repairs	Basin Footage (lf)	No. of Laterals	09/01 Peak Factor	10/01 Peak Factor	RDII Signature
203	1a	private laterals	5,639	39	5.0	3.3	Y
615	2	Mainline Contractor	5,594		8.67	did not cycle	Y
763	1b	Private laterals					Y
851	1b	Private laterals	10,414		2.59	2.17	Y
1004	2	Mainline Contractor	10,340		4.44	did not cycle	Y

3.6.2 Basins Selected January 2003

In December 2002, MDWASD was completing their repairs to the Group 1 and 2 basins mainlines and wanted to begin work on additional basins. At the same time, the MDWASD RDII database was still under construction, and only the East/West basin location data had been generated. The hydrograph review had been completed and the *Hydrograph Evaluation* table had been constructed. Also, the basin size information was available. Using the incomplete data, the basins were sorted for those with a RDII signature and a basin size less than 15,000 linear feet. This list was reduced further by sorting for basins with high peak factors. Next the September and October 2001 hydrographs were briefly reviewed and the proximity of each basin was determined. Basins that were located near basins that had already been selected were removed from the list. A list of six basins was submitted to MDWASD on January 17, 2003 and are shown in **Table 3-5** below. These pump station basins were later reviewed by the working group and all were suitable to remain on the Group 3 final list.

Table 3-5
Pump Stations Selected January 2003

Pump Station No.	Basin Footage (lf)	No. of Laterals	09/01 Peak Factor	10/01 Peak Factor	RDII Signature
336	3,572		8.3	3.5	Y
378	13,317		4.1	3.4	Y
564	7,143	170	4.8	6.3	Y
729	5,044		8.1	4.0	Y
753	7,175	92	5.8	3.7	Y
885	6.581		4.2	2.7	Y

Section 4 MDWASD RDII Database Additional Uses

4.1 SORTING THE LIST OF SELECTED BASINS

4.1.1 Similar Basins

After the 34 selected pump station basins were identified, it was noted that four pairs of pump station basins had similar characteristics. The hydrographs for each pair were reviewed and the preferred stations were identified. This was documented in a letter dated March 24, 2003 to MDWASD. **Table 4-1** provides information about the four pairs of basins. The shaded pump stations are the stations that should be prioritized over the other similar basin.

Table 4-1
Similar Basins in Final Selection

Pump Station	Basin Footage	Number of Laterals	09/01 Peak Factor	10/01 Peak Factor	North Central or South	Lateral Age	Zoning Characteristics
194	10,570		7.4	8.6	N	1963	Commercial
195	8,650		4.0	2.4	N	1968	Commercial
509	10,595	154	2.4	3.6	С	1989	Multi-Family
524	8,562		3.6	2.9	С	1983	Single Family / Multi-Family
828	4665		3.4	3.1	С	1978	Single Family / Multi-Family
829	1,527		4.2	3.4	С	1968	Multi-Family
1032	8,075		2.1	3.6	S	1989	Single Family
1033	9,594		2.5	3.3	S	1990	Single Family

4.1.2 Scheduling

Miami-Dade desires to complete the pump station basins located within wellhead protection zones first. In addition, because of budget limitations and a desire to complete as many basins as possible, the decision was made to repair the smaller basins first. The list of selected basins was sorted by location in a wellhead protection zone and then by size. There are eight pump stations located within wellhead protection zones. A query and report was created in the Microsoft AccessTM database called *RDII*

2003 Final List which shows the selected pump station basins excluding the four similar pairs and sorts the basins by size.

4.2 OTHER USES FOR THE MDWASD RDII DATABASE

The MDWASD RDII Database can be used for a variety of MDWASD projects and to view select information. The database can be linked to other databases MDWASD uses to track repairs and SSES work. The first page of each report discussed below is provided in **Appendix D**.

4.2.1 Identifying Additional Basins for Lateral Repairs

If the CLIP is successful, the program may be expanded. The database can be used to identify additional basins for lateral repairs. Several queries and reports have been created to show basins that had an RDII signature and their characteristics. The *RDII* < 15000 feet query was used to generate the short list of basins. As additional hydrographs are reviewed and added to the database, additional basins less than 15000 feet can be identified for lateral repairs.

Additional data is not needed to identify more basins for lateral repairs. A query was created called RDII > 15000 < 20000 feet which identifies basins that are larger than 15,000 linear feet but smaller than 20,000 linear feet. Without additional data, these basins would be the next logical group of basins to use for lateral repairs.

4.2.2 Identifying RDII Basins

The database can be used to identify basins with adequate hydrographs and an RDII signature. These basins could be prioritized over others for repairs. Two queries and reports were created to show RDII basins and their characteristics. The *RDII Pump Stations and Characteristics* query and report shows basic characteristics such as address, basin size and peak factors for basins with an RDII signature. The *RDII Pump Stations and Night Flows* report shows limited hydrograph information with the night flow data.

4.2.3 Reviewing Night Flow Data

Night flow was a parameter of interest indicated in the October 2002 CLIP Basin Selection Protocol. The database can be used to review night flows for all pump stations and compare it to the RDII data. The *Night Flows* report shows every pump station basin, cycling pump information, peak factors and night flows.

4.2.4 Identifying Re-Pump Stations and Multi-Speed Stations

The database can be used to identify pump stations that re-pump flow to another pump station, pump stations with multi-speed pumps and re-pump station paths. Two

queries and three reports were created for this purpose. The *Repump Query* query and report and the *Multi Speed Pumps* query and report provide a list of stations with the indicated characteristic. The *Repump Upstream Paths* report provides the user with a report showing each wastewater plant and pump station receiving flow from another pump station.

4.2.5 Identifying Pump Stations with Adequate Capacity

The database may be used to identify pump stations that continued to operate properly during rainfall events. When the pumps in a station continue to turn on and off in response to the float controls and the liquid level in the wet well, it can also be called a cycling pump station. At this time, two events are entered into the RDII database, the September 27 to 29, 2001 event, a five year three-day storm, and the October 3, 2000 event which was a 100 year rainfall event. The *Non-Cycling Pump Stations* shows all pump stations that did not cycle for either event. The *Cycles 09/01* and *Cycles 10/00* queries and reports shows all of the pump stations that cycled during the respective rainfall events.

4.2.6 Identifying Inconsistent Databases

The database can be used to identify pump stations that do not have records in the Basin Characteristics database. The pump station basins listed in the RDII database table come from several MDWASD sources. *The RDII Database w/o Matching Basin Inventory* query and report lists all of the pump stations which are not found in the *Basin Inventory* table. This list of stations should be verified to identify those stations that no longer exist and stations that should be entered into the Basin Inventory table.

4.2.7 Developing System Wide Peak Factor Charts

The hydrograph evaluation data was kept in a Microsoft ExcelTM spreadsheet to allow a user to perform calculations and create system wide peak factor charts from the data. Modifications and additions must be made to the ExcelTM spreadsheet.

4.3 UPDATING THE DATABASE

As more rainfall events or additional characteristics are identified for study, the resulting data could be entered into the database. Due to the way AccessTM operates, the queries and reports will need to be added or modified to show the new data.

4.3.1 Forms

A form was created for each table to improve and simplify data entry. The *RDII Database* form includes option buttons and list boxes for yes/no and restricted fields. A pick list is provided for the zoning characteristic field to ensure consistency in the way

the data is entered. Instructions are also provided on the form to assist the user. Instructions are also provided with the *Upstream PS List Tabular Entry* form.

Section 5 RDII Database Structure

5.1 DATABASE STRUCTURE

Microsoft AccessTM stores data in several major objects including tables, queries, Form and reports. Tables are used to store raw data and Queries are used to analyze the data contained in one or more Tables or found in other Queries. Forms are used to simplify data entry and Reports are used to print data from tables or queries. The MDWASD RDII Database is made up of the objects described in **Table 5-1**.

Table 5-1
Database Objects

Object	Name	Description
Table	Basin Inventory	Created by MDWASD staff, includes Night Flows and Basin Size
Table	Hydrograph Evaluation	Imported from Microsoft Excel TM , this table includes the data read from the September 2001 and October 2001 hydrographs and calculated data.
Table	RDII Database	Table created to store information identified in the CLIP Basin Selection Protocol.
Table	tblUpstreamPaths	Created by MDWASD staff to show pump stations paths to each wastewater plant
Table	Upstream PS List	Created by MDWASD staff to show pump stations and their upstream stations. The Table was slightly modified to make it easier to identify re-pump stations.
Query	Basin Characteristics	Combines data from two tables, Basin Characteristics and RDII Database and the RePump Query
Query	Cycles 09/01	Limits data from the RDII Database table to pump stations that cycled during the target September 2001 rainfall event
Query	Cycles 10/00	Limits data from the RDII Database table to provide a list of pump stations that cycled during the October 3, 2000 rainfall event
Query	Group 1 and 2 Selected Basins	Limits data from the RDII Database table to provide a list of pump stations that were selected prior to 2003 for the CLIP
Query	Group 3 Selected Basins	Limits data from the RDII < 15000 feet to provide the list of basins selected in 2003 for the CLIP
Query	Multi Speed Pumps Query	Limits data from the RDII Database table to provide a list of pump stations with multi-speed pumps
Query	Non-Cycling Pump Stations	Limits data from the RDII Database table to provide a list of pump stations that did not cycle during both the September 2001 and October 2000 rainfall events
Query	Pump Station Night Flows	Combines data from the Basin Characteristics and RDII Database tables and shows peak factors and night flows

Object	Name	Description
Query	RDII < 15000 feet	This query is used to implement the CLIP Basin Selection Protocol. It combines data from three tables and one query and limits data to pump stations with a RDII signature and a basin size less than 15,000 feet
Query	RDII > 15000 < 20000 feet	Same as RDII < 15000 feet but limits the pump stations to basins with 15,000 to 20,000 feet
Query	RDII Database and Re-Pump	Combines all data from the RDII Database table and the RePump Query
Query	RDII Database Without Matching Basin Inventory	Provides a list of pump stations found in the RDII database table but are not found in the Basin Inventory table
Query	RDII Final List	Limits the RDII < 15000 feet query to only the stations selected for the CLIP
Query	RDII Pump Stations and Characteristics	Same as RDII < 15000 feet but shows all basins with a RDII signature
Query	RDII Pump Stations and Night Flows	Combines data from three tables and one queries and shows Basin and Night Flow information for pump stations with a RDII Signature
Query	RePump Query	Limits the data from the Upstream PS List Table to show each pump station and calculates if the station re-pumps flow. This is a critical Query and is used in many of the other Queries including the one used to select the CLIP basins.
Query	RePump Stations	Limits the data from the RePump Query to provide a list of pump stations that re-pump flow
Form	Basin Inventory	Provides a data entry interface for the corresponding table
Form	RDII Database	Provides instructions and a data entry interface for the corresponding table
Form	tblUpstreamPaths	Provides a tabular data entry sheet for the corresponding table
Form	Upstream PS List	Provides a tabular data entry sheet for the corresponding table
Report	Basin Characteristics	Allows the user to print data from the Basin Characteristics query. The data is arranged so information for each pump station is displayed individually per page.
Report	Basin Characteristics – Table	Allows the user to print data from the Basin Characteristics query. The data is displayed in tabular form.
Report	Cycles 09/01	Allows the user to print data from the corresponding query. The data is displayed as a list.
Report	Cycles 10/00	Allows the user to print data from the corresponding query. The data is displayed as a list.
Report	Group 1 and 2 Selected Basins	Allows the user to print data from the corresponding query. The data is displayed in tabular form
Report	Group 3 Selected Basins	Allows the user to print data from the corresponding query. The data is displayed in tabular form

Object	Name	Description
Report	Hydrograph Evaluation	Allows the user to print data from the corresponding table. The data is displayed in tabular form.
Report	Multi Speed Pumps	Allows the user to print data from the corresponding query. The data is displayed as a list.
Report	Night Flows	Allows the user to print data from the corresponding query in tabular form.
Report	Non-Cycling Pump Stations	Allows the user to print data from the corresponding query. The data is displayed as a list.
Report	RDII < 15000 feet	Allows the user to print data from the corresponding query in tabular form.
Report	RDII > 15000 < 2000 feet	Allows the user to print data from the corresponding query in tabular form.
Report	RDII Database w/o matching Basin Inventory	Allows the user to print data from the corresponding query. The data is displayed as a list.
Report	RDII Pump Stations and Characteristics	Allows the user to print data from the corresponding query in tabular form.
Report	Repump Stations	Allows the user to print data from the corresponding query. The data is displayed as a list.
Report	Repump Upstream Paths	Allows the user to print data from the tblUpstreamPaths

5.1.1 Tables

Each AccessTM table consists of a Field Name and Data Type. Data Types include numbers, dates and text. For some fields, the data entry has been restricted. A user can view information about the datafields in each table in the design view.

Three tables were obtained from the MDWASD staff and only one, the *Upstream PS List*, was slightly modified. The *Upstream PS List* database was modified to make it easier to sort and identify the pump stations that were re-pumping flow. The Pump Station Number field was changed from a text field to a number field because the Basin Number field in the *RDII Database* table was also a number. This makes it possible for a user to cross check the fields between both tables. To ease the identification of re-pump stations, if the station was a re-pump station, its number was entered into the *UpStream column* and a zero was entered into the *UpstreamLev column*.

Two tables were created for this project, the *RDII Database* table and the *Hydrograph Evaluation* table. **Table 5-2** provides details about the *RDII Database* table. **Table 5-3** provides details about the Hydrograph Evaluation table.

Note – Changing a Table field name or data type will create errors in Queries, Forms and Reports based on the Table.

Table 5-2 RDII Database Table Details

Field Name	Data Type	Information				
Basin Number	Number	This is the primary key field and contains the unique number that corresponds to each pumping station. This field is formatted as a numeric number to facilitate sorting.				
Single Speed	Yes/No	The data automatically defaults to "Yes", all variable speed pumps have been changed to "No".				
Cycles during 9/01 Storm Event	Text	Indicates if the pump station cycled during the 9/27 through 9/29/01 storm event, a three-day, five-year rainfall event. The field is restricted, a Y is entered for Yes, N for No or C for close. The field may also be left blank.				
Cycles during 10/00 Storm Event	Text	Indicates if the pump station cycled during the 10/03/2000 storm event, a one-day, one-hundred year rainfall event. The field is restricted, a Y is entered for Yes, N for No or C for close. The field may also be left blank.				
North, Central or South	Text	This field indicates the north, central or south physical proximity of the station and is not related to the wastewater plants' service area. The field is restricted, a user may only enter N for North, C for Central or S for South. A pump station is considered North if it is located north of N.W. 58th Street, N.W. 54th Street or Hialeah Drive. A station is considered South if it is located south of S.W. 136th Street and all other pump stations are Central.				
East or West	Yes/No	This field indicates the east or west physical proximity of the station. The data automatically defaults to "West", all pump stations east of US-1 have been changed to "East".				
Wellfield Protection Area	Yes/No	The data automatically defaults to "No", all pump stations located in wellfield protection areas have been changed to "Yes".				
Pump Station Area Zoning	Text	This field provides the average zoning for the properties within the basins.				
Basin Population	Number, Long Integer	The population served by each basin.				
Pipe Material	Text	The pipe material of the gravity collection system within the basin.				

Field Name	Data Type	Information
Estimated Lateral Age		This field provides the average date the buildings within the basin were constructed which is assumed to be the year the lateral was constructed.

Table 5-3 Hydrograph Evaluation Table Details

Field Name	Data Type	Information				
Basin Number	Number	This is the primary key field and contains the unique number that corresponds to each pumping station. This field is formatted as a numeric number to facilitate sorting.				
9/01 Average	Number, Long	Average flow visually estimated from the 9/01				
Flow Rate (gpm)	Integer	hydrograph				
10/01 Average	Number, Long	Average flow visually estimated from the 10/01				
Flow Rate (gpm)	Integer	hydrograph				
9/01 Peak	Number, Long	Average Peak Flow visually estimated from the 9/01				
Flow Rate (gpm)	Integer	hydrograph				
10/01 Peak	Number, Long	Average Peak Flow visually estimated from the				
Flow Rate (gpm)	Integer	10/01 hydrograph				
9/01 Peak Factor	Number, Single	The 9/01 Peak Flow divided by the 9/01 Average Peak Flow				
10/01 Peak Factor	Number, Single	The 10/01 Peak Flow divided by the 10/01 Average Peak Flow				
RDII Signature for 9/01 Event	Text	Calculated Field, enters Y for Yes if the Peak Factor is greater than 2 for the September 27-29, 2001 rainfall event, otherwise enters N for No				
RDII Signature for 10/01 Event	Text	Calculated Field, enters Y for Yes if the Peak Factor is greater than 2 for the October 21, 2001 rainfall event, otherwise enters N for No				
RDII Signature	Text	Calculated Field, enters Y for Yes if the Peak Factor is greater than 2 for the September and October 2001 rainfall events, otherwise enters N for No				

5.1.2 Queries

Several custom Queries have been developed. **Table 5-4** provides details about these queries. When field criteria were used to limit the data shown in the query, the field and criteria are included in the Table.

Note – The RePump Query was created to avoid duplicate data entry. This Query is used in subsequent Queries and should not be altered or deleted.

Table 5-4 Query Details

Query	Data Sources	Field	Criteria
Basin Characteristics	RDII Database Table Basin Inventory Table Repump Query	No Criteria Selected	
Cycles 09/01	RDII Database Table	No Criteria Selected	
Cycles 10/00	RDII Database Table	No Criteria Selected	
Group 1 and 2 Selected Basins	RDII Database Table	Basin No.	= 35 or 47 or 116 or 118 or 191 or 203 or 615 or 767 or 851 or 1004
Multi Speed Pumps Query	RDII Database Table	Single Speed	No
Non-Cycling Pump	DDU Datalana Talah	Cycles During 09/01 Storm Event	Is Null or N
Stations	RDII Database Table	Cycles During 10/00 Storm Event	Is Null or N
Pump Station Night Flows	RDII Database Table Basin Inventory Table	No Criteria Selected	
	RDII Database Table	Single Speed	Yes
RDII < 15000 feet	Hydrograph Evaluation	Basin Footage	< 15001
KDII < 13000 feet	Basin Inventory Table	Peak Factor 9/01	> 2.00
	Repump Query	Peak Factor 10/01	> 2.00
	RDII Database Table	Single Speed	Yes
RDII > 15000 < 2000 feet	Hydrograph Evaluation	Basin Footage	> 15000 < 20001
KDII > 13000 < 2000 feet	Basin Inventory Table	Peak Factor 9/01	> 2.00
	RePump Query	Peak Factor 10/01	> 2.00
RDII Database and Re-Pump	RDII Database Table RePump Query	No Criteria Selected	
RDII Database Without Matching Basin Inventory	RDII Database Table Basin Inventory Table	Basin Number	Is Null
Group 3 Selected Basins	RDII < 15000 feet	Basin No.	= (list of stations)
	RDII Database Table	Single Speed	Yes
RDII Pump Stations and	Hydrograph Evaluation	Peak Factor 9/01	> 2.00
Characteristics	Basin Inventory Table RePump Query	Peak Factor 10/01	> 2.00

Query	Data Sources	Field	Criteria
	RDII Database Table	Single Speed	Yes
RDII Pump Stations and	Hydrograph Evaluation	Peak Factor 9/01	> 2.00
Night Flows	Basin Inventory Table RePump Query	Peak Factor 10/01	> 2.00
		Upstream	Is Not Null Is Null
		UpstreamLev	0
RePump Query	Upstream PS List Table	Re-Pump Station: Format([Upstream PS List]![UpStream] Is Not Null,"Yes/No")	
Re-Pump Stations	RDII Database Table RePump Query	Re-Pump Station	Yes

5.2 REPORTS

Queries are used to filter, evaluate and compare data from one or more Tables on the computer. Queries are not print ready. Therefore a custom Report has been generated for each Query and a description of each are found in **Table 5-5**.

Table 5-5 Report Details

Report	Description				
Basin Characteristics	This report shows all of the data that is contained in the Basin Characteristics Query. Each page contains all of the available data for a single pump station. This report is for a user that wants to review data for a few stations or view all available data for one station.				
Basin Characteristics-Table	This report shows all of the data that is contained in the Basin Characteristics Query in tabular form on 11 by 17 paper. For some of the fields, results of interest are given in bolded red text. This report is for a user that wants to see data for a large number of pump stations.				

Report	Description
Cycles 09/01	This report shows a list in 3 columns of the pump stations that cycled during the September 27-29, 2001 rainfall event and the total number of pump stations is shown on the last page of the report. The report prints on 8.5 by 11 sized paper.
Cycles 10/00	This report shows a list in 3 columns of the pump stations that cycled during the October 3, 2000 rainfall event and the total number of pump stations is shown on the last page of the report. The report prints on 8.5 by 11 sized paper.
Group 1 and 2 Selected Basins	This report shows the list of group 1 and 2 basins selected prior to 2003 for the CLIP in tabular form and prints on 11 by 17 sized paper. The basins are s sorted by name. For some of the fields, results of interest are given in bolded red text.
Group 3 Selected Basins	This report shows the list of group 3 basins selected in 2003 for the CLIP in tabular form and prints on 11 by 17 sized paper. The basins found in wellfield protection areas are listed first and then the basins are sorted by size. For some of the fields, results of interest are given in bolded red text.
Hydrograph Evaluation	This report shows all of the data that is contained in the Hydrograph Evaluation Table in tabular form on 8.5 by 11 paper. For some of the fields, results of interest are given in bolded red text.
Multi Speed Pumps	This report shows a list in 3 columns of the pump stations that have multi-speeds and the total number of pump stations is shown on the last page of the report. The report prints on 8.5 by 11 sized paper.
Night Flows	This report shows all basins and their night flow data in tabular form on 8.5 by 11 paper. For some of the fields, results of interest are given in bolded red text.
RDII < 15000 feet	This report shows all basins with a RDII Signature and a basin size that is less than 15,000 linear feet in tabular form on 11 by 17 sized paper. This is the query that was used to select the basins for the CLIP. For some of the fields, results of interest are given in bolded red text.

Report	Description
RDII > 15000 < 20000 feet	This report shows all basins with a RDII Signature and a basin size that is greater than 15,000 linear feet but less than 20,000 linear feet in tabular form on 11 by 17 sized paper. This query was generated for use in the event a sufficient number of basins could not be selected from the RDII < 15000 feet list.
RDII Database	This report shows all of the data that is contained in the RDII Database Table in tabular form on 11 by 17 sized paper. For some of the fields, results of interest are given in bolded red text.
RDII Database w/o matching Basin Inventory	This report shows a list in 3 columns of the pump stations that have records in the RDII Database Table but not in the Basin Inventory Table. The report prints on 8.5 by 11 sized paper.
RDII Pump Station and Night Flows	This report provides information from the query by the same name in tabular form and prints on 11 by 17 sized paper. For some of the fields, results of interest are given in bolded red text.
RDII Pump Stations and Characteristics	This report provides the information from the query of the same name and prints in tabular form on 11 by 17 sized paper. For some of the fields, results of interest are given in bolded red text.
RePump Stations	This report shows a list in 3 columns of the pump stations that re-pump flows and the total number of pump stations is shown on the last page of the report. The report prints on 8.5 by 11 sized paper.
Repump Upstream Paths	This report shows data from the Upstream PS List Table in tabular form and prints on 8.5 by 11 sized paper.



APPENDIX A CLIP BASIN SELECTION PROTOCOL



Appendix A CLIP Basin Selection Protocol

The following protocol shall be conducted for each applicable Miami-Dade Water and Sewer Department Pump Station to determine if the station has a Rainfall Dependent Infiltration and Inflow (RDII) signature for the Comprehensive Lateral Investigation Program (CLIP).

- Step 1: Review the databases for all pump stations and identify all of the pump stations that are designed to operate less than 24 hours per day, 7 days per week (essentially single speed pump stations). Only these pump stations will be evaluated further for part of the Lateral Pilot Study.
- Step 2: Identify two storm events (S.E.) that display the characteristics of a 24-hour rainfall event with about a 2-year return frequency. When data can not be obtained for a storm with this specific characteristic, a 72-hour rainfall event with a 2 or 1-year return frequency or a 24-hour rainfall event with a 1-year return frequency shall suffice.
- Step 3: Generate a hydrograph for each pump station identified in Step 1 and each storm event identified in Step 2. Each hydrograph should bracket, where possible, a 30-day period with the S.E. occurring around the middle of the timeframe chosen. The hydrograph shall represent the flow rate into the station and the change in the liquid level of the wetwell (span).
- Step 4: Review the hydrographs generated as part of Step 3 and determine if the pumps in the station cycled during the storm event. Only these pump stations will be evaluated further for inclusion in the Lateral Pilot Study.
- Step 5: For all pump stations identified in Step 4, review the hydrograph during the days the storm event did not appear to influence flow and estimate the average flow rate. Assume that this is the average daily flow rate during non S.E. conditions and record the average value.
- Step 6: For all pump stations identified in Step 4, review the hydrograph both during and immediately after the days the storm occurred and estimate the average flow during a 24-hour period. Assume that this is the peak daily flow rate during S.E. conditions and record the average peak flow value.
- Step 7: Calculate the RDII peaking factor for each pump station identified in Step 4 by dividing the peak daily flow rate obtained in Step 6 with the average daily flow rate obtained in Step 5.

- a. If the RDII peaking factor is equal to or greater than 2, continue the evaluation.
- b. If the peaking factor is less than 2, the pump station will be considered as having no RDII signature for the purposes of this study.
- Step 8: For each pump station identified in Step 7a; review the pump station atlas, map and repump list, to determine if the pump station is a repump station.
 - a. If the pump station is not a repump station and has its own public collection system, continue the evaluation.
 - b. If the pump station is a repump station and it receives flow from a public collection system, continue the evaluation.
 - c. If the pump station is a repump station, but it does not receive flow from its own public collection system, the pump station will be considered as having no RDII signature for the purposes of this study.
- Step 9: For all pump stations identified in Step 8b, subtract the upstream pump station flow contribution from the repump station for both average and peak daily flow. Assume that the adjusted flow represents the S.E. conditions for the repump station gravity system. Calculate the adjusted RDII peaking factor by dividing the adjusted peak daily flow with the adjusted average daily flow.
 - a. If the RDII peaking factor greater than 2.0, continue the evaluation.
 - b. If the RDII peaking factor is less than 2, the pump station will be considered as having no RDII signature for the purposes of this study.

Each pump station identified in Step 8a and Step 9a will be considered as having a RDII signature. To complete the CLIP, a representative sample of the various types of RDII pump station basins (RDII basins) will be selected. These pump stations will be ranked according to the following criteria in the order indicated.

1. Pump Station Basin Size:

The number of RDII basins will be reduced by sorting the list by small or medium sized basins, those with less than 15,000 linear feet of gravity sewer. The number will be reduced to increase the variety of RDII basins that can be studied.

2. Pump Station Basin Location:

After the RDII basins have been reduced, RDII basins that represent various geographical areas of Miami-Dade County will be selected. The following location categories will be considered:

- a) North District
- b) Central District
- c) South District
- d) Type of Zoning
- e) Coastal (East of US-1)
- f) Inland (West of US-1)
- g) Within potable water wellfield protection zone
- h) Adjacent to primary surface water body such as the Miami River
- 3. Pump Station Basin Gravity System Condition:

After the RDII basins have been sorted by size and location, the condition of the gravity system will be the considered. These criteria will include:

- a) Age
- b) Pipe Material
- 4. Pump Station Basin Other Criteria

Other criteria that may be considered to select RDII basins for the CLIP are:

- a) Population
- b) NAPOT Data
- c) Night flow data and GPIDPM calculations
- d) Flow patterns that change from work week to weekend
- e) Soil Conditions
- f) Groundwater Elevation

Appendix A CLIP Basin Selection Protocol

The following protocol shall be conducted for each applicable Miami-Dade Water and Sewer Department Pump Station to determine if the station has a Rainfall Dependent Infiltration and Inflow (RDII) signature for the Comprehensive Lateral Investigation Program (CLIP).

- Step 1: Review the databases for all pump stations and identify all of the pump stations that are designed to operate less than 24 hours per day, 7 days per week (essentially single speed pump stations). Only these pump stations will be evaluated further for part of the Lateral Pilot Study.
- Step 2: Identify two storm events (S.E.) that display the characteristics of a 24-hour rainfall event with about a 2-year return frequency. When data can not be obtained for a storm with this specific characteristic, a 72-hour rainfall event with a 2 or 1-year return frequency or a 24-hour rainfall event with a 1-year return frequency shall suffice.
- Step 3: Generate a hydrograph for each pump station identified in Step 1 and each storm event identified in Step 2. Each hydrograph should bracket, where possible, a 30-day period with the S.E. occurring around the middle of the timeframe chosen. The hydrograph shall represent the flow rate into the station and the change in the liquid level of the wetwell (span).
- Step 4: Review the hydrographs generated as part of Step 3 and determine if the pumps in the station cycled during the storm event. Only these pump stations will be evaluated further for inclusion in the Lateral Pilot Study.
- Step 5: For all pump stations identified in Step 4, review the hydrograph during the days the storm event did not appear to influence flow and estimate the average flow rate. Assume that this is the average daily flow rate during non S.E. conditions and record the average value.
- Step 6: For all pump stations identified in Step 4, review the hydrograph both during and immediately after the days the storm occurred and estimate the average flow during a 24-hour period. Assume that this is the peak daily flow rate during S.E. conditions and record the average peak flow value.
- Step 7: Calculate the RDII peaking factor for each pump station identified in Step 4 by dividing the peak daily flow rate obtained in Step 6 with the average daily flow rate obtained in Step 5.

- a. If the RDII peaking factor is equal to or greater than 2, continue the evaluation.
- b. If the peaking factor is less than 2, the pump station will be considered as having no RDII signature for the purposes of this study.
- Step 8: For each pump station identified in Step 7a; review the pump station atlas, map and repump list, to determine if the pump station is a repump station.
 - a. If the pump station is not a repump station and has its own public collection system, continue the evaluation.
 - b. If the pump station is a repump station and it receives flow from a public collection system, continue the evaluation.
 - c. If the pump station is a repump station, but it does not receive flow from its own public collection system, the pump station will be considered as having no RDII signature for the purposes of this study.
- Step 9: For all pump stations identified in Step 8b, subtract the upstream pump station flow contribution from the repump station for both average and peak daily flow. Assume that the adjusted flow represents the S.E. conditions for the repump station gravity system. Calculate the adjusted RDII peaking factor by dividing the adjusted peak daily flow with the adjusted average daily flow.
 - a. If the RDII peaking factor greater than 2.0, continue the evaluation.
 - b. If the RDII peaking factor is less than 2, the pump station will be considered as having no RDII signature for the purposes of this study.

Each pump station identified in Step 8a and Step 9a will be considered as having a RDII signature. To complete the CLIP, a representative sample of the various types of RDII pump station basins (RDII basins) will be selected. These pump stations will be ranked according to the following criteria in the order indicated.

1. Pump Station Basin Size:

The number of RDII basins will be reduced by sorting the list by small or medium sized basins, those with less than 15,000 linear feet of gravity sewer. The number will be reduced to increase the variety of RDII basins that can be studied.

2. Pump Station Basin Location:

After the RDII basins have been reduced, RDII basins that represent various geographical areas of Miami-Dade County will be selected. The following location categories will be considered:

- a) North District
- b) Central District
- c) South District
- d) Type of Zoning
- e) Coastal (East of US-1)
- f) Inland (West of US-1)
- g) Within potable water wellfield protection zone
- h) Adjacent to primary surface water body such as the Miami River
- 3. Pump Station Basin Gravity System Condition:

After the RDII basins have been sorted by size and location, the condition of the gravity system will be the considered. These criteria will include:

- a) Age
- b) Pipe Material
- 4. Pump Station Basin Other Criteria

Other criteria that may be considered to select RDII basins for the CLIP are:

- a) Population
- b) NAPOT Data
- c) Night flow data and GPIDPM calculations
- d) Flow patterns that change from work week to weekend
- e) Soil Conditions
- f) Groundwater Elevation



APPENDIX B BASINS SELECTED FOR THE COMPREHENSIVE LATERAL IMPROVEMENT PROGRAM



Appendix B

Basins Selected for the Comprehensive Lateral Improvement Program

All the pump stations selected for Group 3 have single speed motors, less than 15,000 linear feet and peak factors greater than 2.0 for both storms. None of the pump stations re-pump flow

The pump stations highlighted in grey are similar to another pump station basin in size, location and area zoning.

North – all pump stations north of NW 58th St, Hialeah Dr and NW 54th St

Central – all pump stations that are not north or south

South – all pump stations south of SW 136 Street

East – all pump stations east of US-1, Note that if the pump station is also south, the station is not likely to be tidally influenced, in sandy soil or affected by chlorides

Table B-1
Selected Basins

Pump Station No	Group	Basin Footage (lf)	Number Laterals	Sept. 2001 Peak Factor	Oct. 2001 Peak Factor	RDII Signature	North Central South	East West	Wellfield Protection Area	Zoning Characteristics Adjacent to the Pump Station	Estimated Year Lateral Constructed	Pump Station Address	Comments
116	1a	1,548		8.6	5.9	Yes	С	West	No	Commercial	1979	8720 NW 13 Terr	Initial Selection for mini pilot
191	1a	6,958	60	14.2	4.8	Yes	N	West	No	Commercial / Multi-Family		7598 NW 24 Ave	Early pilot
203	1a	5,639		5.0	4.1	Yes	C	West	No	Commercial	1995	1400 NW 84 Ave	Early pilot
47	1b	13,648	327		Did not cycle		N	West	No			8109 NE 3 PL	Has P.F.>3; but did not cycle
118	1b	4,314		6.7	1.8	No	N	West	No	Commercial	1972	5999 NW 82 Ave	High antecedent flow in Oct. reduced P.F.; selected prior to hydrograph review
763	1b	5,594		2.0	2.0	No	C	West	Yes	Multi-Family	1972	8351 SW 79 Ave	
851	1b	10,414		2.6	2.2	No	С	West	Yes	Multi-Family	1977	14402 SW 59 St	
35	2	4,367	97	2.1	1.6	No	N	West	No	Commercial	1954	8090 NE 4 PL	Selected prior to hydrograph review.
615	2	11,273	215	8.7	Did not cycle		С	West	Yes	Single Family	1956	4147 SW 108 CT	Has P.F.>5; but did not cycle in Oct. 01 S.E.
1004	2	10,340		4.4	Did not cycle		S	East	Yes	Single Family / Multi-Family	1953	15794 SW 292 St	Has P.F.>2; but did not cycle in Oct.01 S.E.; had span or wet well problem
58	3	4,767		3.2	2.4	Yes	С	East	No	Single Family	1946	930 Venetian Causeway	Tidal influence
126	3	1,895		2.2	2.7	Yes	С	West	No	Multi-Family / Commercial	1986	10725 SW 3 St.	Sweetwater Area
154	3	3,583		4.0	2.8	Yes	C	West	No	Commercial	1981	3901 NW 79 Ave.	
162	3	5,779		16.4	6.4	Yes	С	West	No	Commercial	1995	8164 NW 25 St.	
194	3	10,570		7.4	4.7	Yes	N	West	Yes	Commercial	1963	6101 NW 74 Ave.	Similar to 195, recommend using 194

Pump Station No	Group	Basin Footage (lf)	Number Laterals	Sept. 2001 Peak Factor	Oct. 2001 Peak Factor	RDII Signature	North Central South	East West	Wellfield Protection Area	Zoning Characteristics Adjacent to the Pump Station	Estimated Year Lateral Constructed	Pump Station Address	Comments
195	3	8,650		3.7	2.7	Yes	N	West	Yes	Commercial	1968	7351 NW 70 St.	Similar to 194, recommend using 194
336	3	3,572		8.3	4.1	Yes	N	West	No	Commercial	1983	15701 NW 59 Ave.	Selected 1/2003
358	3	1,614		6.7	7.3	Yes	N	West	No	Single Family	1957	4401 NW 178 Dr.	On edge of canal
378	3	13,317		4.1	3.4	Yes	N	West	No	Single Family	1955	18041 NW 32 Ave.	Selected 1/2003, high base flow
380	3	8,453	153	4.8	Did not cycle	Yes	N	West	No	Single Family	1968	8420 NW 186 St.	Problem with Oct. data; P.F.>4
405	3	1,354		2.6	2.7	Yes	N	West	No	Multi-Family	1967	6860 Brookline Dr.	
410	3	8,907		8.0	6.3	Yes	N	West	No	Single Family /Multi-Family	1980	19771 E Oakmont Dr.	
509	3	10,595	154	2.4	3.4	Yes	C	West	Yes	Multi-Family	1989	10810 SW 72 St.	Similar to 524, recommend using 509
524	3	8,562		3.6	3.4	Yes	C	West	Yes	Single Family / Multi-Family / Commercial	1983	119 Ave. & SW 80 St.	Similar to 509, recommend using 509
564	3	7,143	170	4.8	7.6	Yes	S	West	No	Single Family	1987	212 St. SW & 125 CT. Rd.	Selected 1/2003, On edge of canal
577	3	8,159		4.0	3.5	Yes	S	East	No	Multi-Family	1989	SW 97 Ave. at 224 St.	
603	3	12,482		3.1	2.7	Yes	S	East	No	Commercial	1970	10800 SW 211 St.	Flattened peaks on hydrograph
608	3	4,603		5.4	5.8	Yes	S	West	No	Single Family / Multi-Family / Commercial	1970	SW 206 St. at 119 Ave.	
681	3	6,750		60.0	8.8	Yes	S	West	No	Commercial	1985	15840 SW 127 Ave.	
708	3	11,816	118	5.3	5.7	Yes	S	East	No	Single Family	1958	10491 SW 202 Terr.	
729	3	5,044		8.1	5.0	Yes	S	West	No	Single Family	1970	9520 SW 136th St.	Selected 1/2003
753	3	7,175	92	5.8	4.8	Yes	C	West	Yes	Single Family	1966	3037 SW 78 CT	Selected 1/2003
790	3	1,554		5.3	6.4	Yes	С	West	No	Commercial	1961	SW 73 Ave. at 83 St.	
802	3	5,335	92	6.1	5.9	Yes	C	West	Yes	Single Family	1961	9200 SW 79 Ave.	
813	3	1,579		3.1	5.4	Yes	C	West	No	Single Family	1958	9090 SW 24 St.	
823	3	9,930	124	4.3	3.8	Yes	С	West	Yes	Single Family	1968	10210 SW 104 St.	Quick recovery
828	3	4,665		3.4	3.6	Yes	С	West	Yes	Single Family	1978	10240 SW 91 Terr.	Similar to 829, recommend using 829
829	3	1,527		4.2	4.5	Yes	С	West	Yes	Multi-Family	1968	9988 SW 88 St.	Similar to 828, recommend using 829
880	3	14,253		4.4	3.0	Yes	С	West	Yes	Single Family	1978	11250 SW 127 Ave.	Between a canal and lake
885	3	6,581		4.2	3.2	Yes	С	West	Yes	Single Family	1979	12255 SW 113 Ave.	Selected 1/2003
1031	3	4,725		5.9	10.8	Yes	S	West	No	Single Family	1989	18510 SW 356 St.	
1032	3	8,075		2.1	3.1	Yes	S	East	No	Single Family	1989	25783 SW 123 Pl.	Similar to 1033, recommend using 1033

Pump Station No	Group	Basin Footage (lf)	Number Laterals	Sept. 2001 Peak Factor	Oct. 2001 Peak Factor	RDII Signature	North Central South	East West	Wellfield Protection Area	Zoning Characteristics Adjacent to the Pump Station	Estimated Year Lateral Constructed	Pump Station Address	Comments
1033	3	9,594		2.5	3.9	Yes	S	East	No	Single Family	1990	25000 SW 130 Ave.	Similar to 1032, recommend using 1033
1063	3	10,594		4.7	4.0	Yes	S	East	No	Single Family	1972	18407 SW 89 Pl.	

Appendix B

Basins Selected for the Comprehensive Lateral Improvement Program

All the pump stations selected for Group 3 have single speed motors, less than 15,000 linear feet and peak factors greater than 2.0 for both storms. None of the pump stations re-pump flow

The pump stations highlighted in grey are similar to another pump station basin in size, location and area zoning.

North – all pump stations north of NW 58th St, Hialeah Dr and NW 54th St

Central – all pump stations that are not north or south

South – all pump stations south of SW 136 Street

East – all pump stations east of US-1, Note that if the pump station is also south, the station is not likely to be tidally influenced, in sandy soil or affected by chlorides

Table B-1
Selected Basins

Pump Station No	Group	Basin Footage (lf)	Number Laterals	Sept. 2001 Peak Factor	Oct. 2001 Peak Factor	RDII Signature	North Central South	East West	Wellfield Protection Area	Zoning Characteristics Adjacent to the Pump Station	Estimated Year Lateral Constructed	Pump Station Address	Comments
116	1a	1,548		8.6	5.9	Yes	С	West	No	Commercial	1979	8720 NW 13 Terr	Initial Selection for mini pilot
191	1a	6,958	60	14.2	4.8	Yes	N	West	No	Commercial / Multi-Family		7598 NW 24 Ave	Early pilot
203	1a	5,639		5.0	4.1	Yes	C	West	No	Commercial	1995	1400 NW 84 Ave	Early pilot
47	1b	13,648	327		Did not cycle		N	West	No			8109 NE 3 PL	Has P.F.>3; but did not cycle
118	1b	4,314		6.7	1.8	No	N	West	No	Commercial	1972	5999 NW 82 Ave	High antecedent flow in Oct. reduced P.F.; selected prior to hydrograph review
763	1b	5,594		2.0	2.0	No	C	West	Yes	Multi-Family	1972	8351 SW 79 Ave	
851	1b	10,414		2.6	2.2	No	С	West	Yes	Multi-Family	1977	14402 SW 59 St	
35	2	4,367	97	2.1	1.6	No	N	West	No	Commercial	1954	8090 NE 4 PL	Selected prior to hydrograph review.
615	2	11,273	215	8.7	Did not cycle		С	West	Yes	Single Family	1956	4147 SW 108 CT	Has P.F.>5; but did not cycle in Oct. 01 S.E.
1004	2	10,340		4.4	Did not cycle		S	East	Yes	Single Family / Multi-Family	1953	15794 SW 292 St	Has P.F.>2; but did not cycle in Oct.01 S.E.; had span or wet well problem
58	3	4,767		3.2	2.4	Yes	С	East	No	Single Family	1946	930 Venetian Causeway	Tidal influence
126	3	1,895		2.2	2.7	Yes	С	West	No	Multi-Family / Commercial	1986	10725 SW 3 St.	Sweetwater Area
154	3	3,583		4.0	2.8	Yes	C	West	No	Commercial	1981	3901 NW 79 Ave.	
162	3	5,779		16.4	6.4	Yes	С	West	No	Commercial	1995	8164 NW 25 St.	
194	3	10,570		7.4	4.7	Yes	N	West	Yes	Commercial	1963	6101 NW 74 Ave.	Similar to 195, recommend using 194

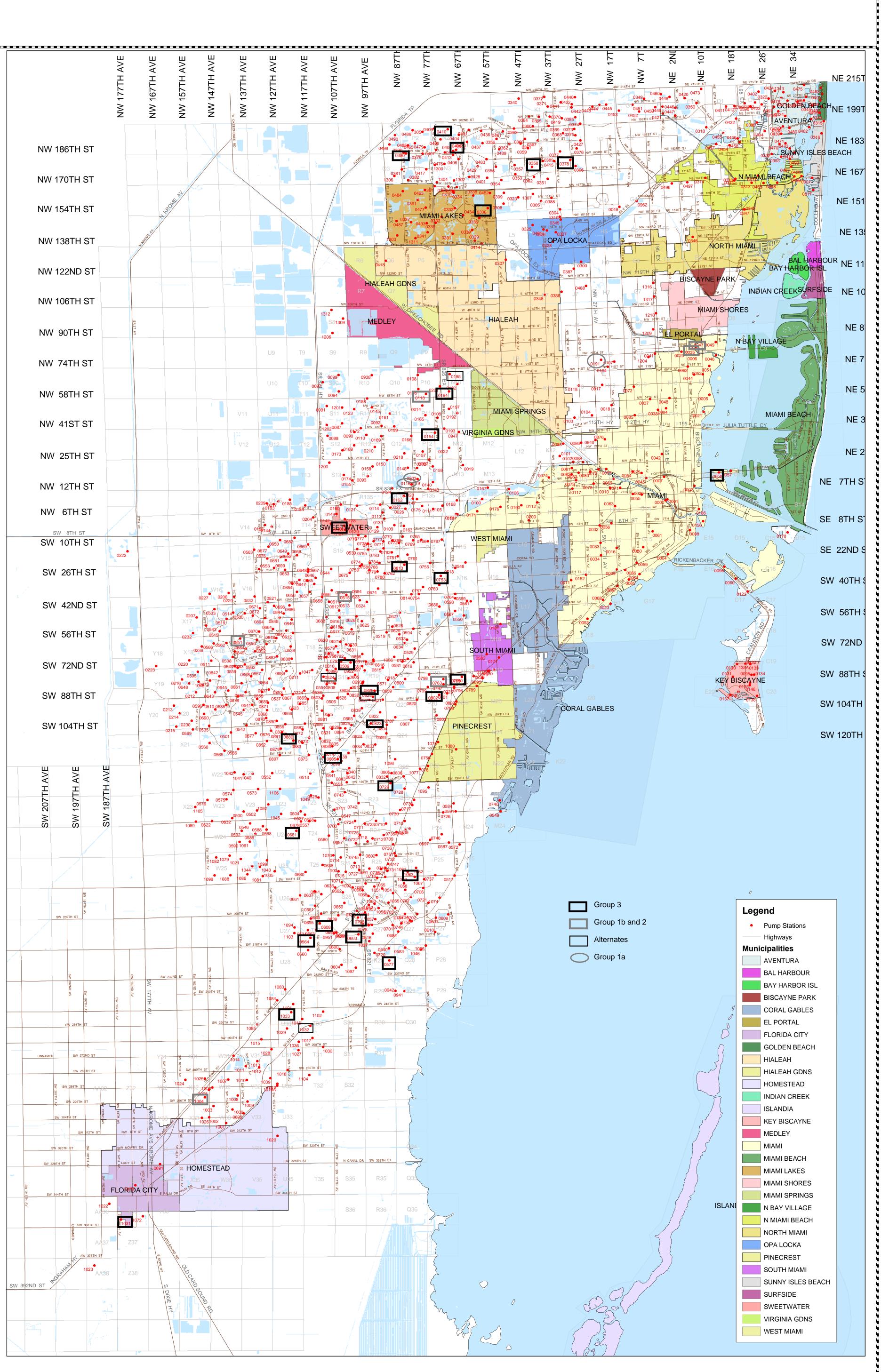
Pump Station No	Group	Basin Footage (lf)	Number Laterals	Sept. 2001 Peak Factor	Oct. 2001 Peak Factor	RDII Signature	North Central South	East West	Wellfield Protection Area	Zoning Characteristics Adjacent to the Pump Station	Estimated Year Lateral Constructed	Pump Station Address	Comments
195	3	8,650		3.7	2.7	Yes	N	West	Yes	Commercial	1968	7351 NW 70 St.	Similar to 194, recommend using 194
336	3	3,572		8.3	4.1	Yes	N	West	No	Commercial	1983	15701 NW 59 Ave.	Selected 1/2003
358	3	1,614		6.7	7.3	Yes	N	West	No	Single Family	1957	4401 NW 178 Dr.	On edge of canal
378	3	13,317		4.1	3.4	Yes	N	West	No	Single Family	1955	18041 NW 32 Ave.	Selected 1/2003, high base flow
380	3	8,453	153	4.8	Did not cycle	Yes	N	West	No	Single Family	1968	8420 NW 186 St.	Problem with Oct. data; P.F.>4
405	3	1,354		2.6	2.7	Yes	N	West	No	Multi-Family	1967	6860 Brookline Dr.	
410	3	8,907		8.0	6.3	Yes	N	West	No	Single Family /Multi-Family	1980	19771 E Oakmont Dr.	
509	3	10,595	154	2.4	3.4	Yes	C	West	Yes	Multi-Family	1989	10810 SW 72 St.	Similar to 524, recommend using 509
524	3	8,562		3.6	3.4	Yes	C	West	Yes	Single Family / Multi-Family / Commercial	1983	119 Ave. & SW 80 St.	Similar to 509, recommend using 509
564	3	7,143	170	4.8	7.6	Yes	S	West	No	Single Family	1987	212 St. SW & 125 CT. Rd.	Selected 1/2003, On edge of canal
577	3	8,159		4.0	3.5	Yes	S	East	No	Multi-Family	1989	SW 97 Ave. at 224 St.	
603	3	12,482		3.1	2.7	Yes	S	East	No	Commercial	1970	10800 SW 211 St.	Flattened peaks on hydrograph
608	3	4,603		5.4	5.8	Yes	S	West	No	Single Family / Multi-Family / Commercial	1970	SW 206 St. at 119 Ave.	
681	3	6,750		60.0	8.8	Yes	S	West	No	Commercial	1985	15840 SW 127 Ave.	
708	3	11,816	118	5.3	5.7	Yes	S	East	No	Single Family	1958	10491 SW 202 Terr.	
729	3	5,044		8.1	5.0	Yes	S	West	No	Single Family	1970	9520 SW 136th St.	Selected 1/2003
753	3	7,175	92	5.8	4.8	Yes	C	West	Yes	Single Family	1966	3037 SW 78 CT	Selected 1/2003
790	3	1,554		5.3	6.4	Yes	С	West	No	Commercial	1961	SW 73 Ave. at 83 St.	
802	3	5,335	92	6.1	5.9	Yes	C	West	Yes	Single Family	1961	9200 SW 79 Ave.	
813	3	1,579		3.1	5.4	Yes	C	West	No	Single Family	1958	9090 SW 24 St.	
823	3	9,930	124	4.3	3.8	Yes	С	West	Yes	Single Family	1968	10210 SW 104 St.	Quick recovery
828	3	4,665		3.4	3.6	Yes	С	West	Yes	Single Family	1978	10240 SW 91 Terr.	Similar to 829, recommend using 829
829	3	1,527		4.2	4.5	Yes	С	West	Yes	Multi-Family	1968	9988 SW 88 St.	Similar to 828, recommend using 829
880	3	14,253		4.4	3.0	Yes	С	West	Yes	Single Family	1978	11250 SW 127 Ave.	Between a canal and lake
885	3	6,581		4.2	3.2	Yes	С	West	Yes	Single Family	1979	12255 SW 113 Ave.	Selected 1/2003
1031	3	4,725		5.9	10.8	Yes	S	West	No	Single Family	1989	18510 SW 356 St.	
1032	3	8,075		2.1	3.1	Yes	S	East	No	Single Family	1989	25783 SW 123 Pl.	Similar to 1033, recommend using 1033

Pump Station No	Group	Basin Footage (lf)	Number Laterals	Sept. 2001 Peak Factor	Oct. 2001 Peak Factor	RDII Signature	North Central South	East West	Wellfield Protection Area	Zoning Characteristics Adjacent to the Pump Station	Estimated Year Lateral Constructed	Pump Station Address	Comments
1033	3	9,594		2.5	3.9	Yes	S	East	No	Single Family	1990	25000 SW 130 Ave.	Similar to 1032, recommend using 1033
1063	3	10,594		4.7	4.0	Yes	S	East	No	Single Family	1972	18407 SW 89 Pl.	



MIAMI - DADE WATER AND SEWER DEPARTMENT Pump Stations By Municipality







APPENDIX C DETAILS ABOUT THE DATA



Appendix C Details about the Data

C.1 HYDROGRAPH DIFFERENCES

For some of the pump stations there were differences between the September and October 2001 hydrographs. **Table C-1** shows 71 pump stations with spans that differed by more than 2 inches or did not indicate the span on at least one of the hydrographs.

Table C-1
Differences in Span
(larger than 2 inches)

Note – the shaded pump stations were selected for the CLIP

Pump Station	Span for 09/01 Hydrograph (inches)	Span for 10/01 Hydrograph (inches)	Notes	
32	14-18	15		
42	None given	38		
60	39-42	42		
70	7-13	7		
82	8-10	7		
90	26-33	29		
107	None given	none given		
118	None given	30	Group 1 Basin	
162	32-36	27	•	
182	None given	none given		
191	None given	none given	Initial Basin	
194	7	9		
203	15-16	35	Initial Basin	
310	18-19	23		
312	10-15	15		
313	25-28	30		
315	6-7	10		
322	33-40	37		
323	16-21	17		
326	10-13	8		
331	20-22	38		
336	28-31	32		
339	20-22	24		
367	15	24		

Pump Station	Span for 09/01 Hydrograph (inches)	Span for 10/01 Hydrograph (inches)	Notes
371	16-20	28	
390	26-30	21	
400	12-14	10	
402	19-21	18	
410	17-19	31	
417	None given	none given	
423	None given	none given	
424	None given	none given	
450	32	28	
459	15-20	7	
477	None given	none given	
481	29	26	
484	32-36	30	
501	None given	none given	
510	None given	none given	
	23-30	26	
528	31-35	35	
535	None given	none given	
577	30-32	29	
601	None given	none given	
608	8-12	11	
622	24-28	27	
634	10-14	11	
666	None given	none given	
681	18-21	8	
684	18-20	24	
685	None given	none given	
704	None given	none given	
729	18-20	22	
790	32-36	26	
813	26-32	29	
822	22-25	21	
880	26-28	22	
885	17-21	16	
1004	None given	16	Group 2 Basin
1012	17-21	18	
1023	None given	none given	
1026	18-24	19	

Pump Station	Span for 09/01 Hydrograph (inches)	Span for 10/01 Hydrograph (inches)	Notes
1029	54-59	55	
1032	17-20	19	Group 3 Alternative Basin
1063	16-20	34	
1078	37	28	
1085	20	15	
1089	None given	23	
1098	20-26	21	
1302	35-38	34	
1305	35-38	none given	

Table C-2 provides information for the pump stations missing data.

Table C-2 Pump Stations with Missing Data

Pump Station	Month Missing Data	Problem with Hydrograph
23	Sept. 2001	Not enough data
45	Oct. 2001	Questionable data
98	Oct. 2001	Missing
141	Oct. 2001	Missing
149	Oct. 2001	Missing
173	Oct. 2001	Missing
226	Oct. 2001	Missing
230	Oct. 2001	Missing
388	Oct. 2001	Missing
418	Oct. 2001	Missing data
420	Sept. 2001	Questionable data
436	Sept. 2001	Does not cycle
445	Oct. 2001	Questionable data
446	Sept. 2001 and Oct. 2001	Incorrect Scale
468	Oct. 2001	Missing
525	Sept. 2001 Peak Flow	Error
563	Oct. 2001	Questionable data
582	Oct. 2001	Questionable data

Pump Station	Month Missing Data	Problem with Hydrograph
597	Oct. 2001	Missing
615	Oct. 2001	Does not cycle
628	Oct. 2001	Missing
634	Sept. 2001 Peak Flow	Questionable data
659	Oct. 2001	Missing
684	Oct. 2001 Peak Flow	Questionable data
686	Oct. 2001 Peak Flow	Questionable data
706	Oct. 2001	Missing
709	Sept. 2001 and Oct. 2001	Questionable data
721	Oct. 2001	Missing
737	Oct. 2001	Missing
749	Sept. and Oct. 2001	Questionable data
879	Oct. 2001	Missing
938	Oct. 2001	Missing
952	Oct. 2001	Missing
1004	Oct. 2001	Did not cycle
1007	Oct. 2001	Missing part of the graph
1090	Oct. 2001	Missing
1097	Oct. 2001	Missing
1101	Oct. 2001	Missing
1204	Oct. 2001	Missing
1301	Oct. 2001	Missing
1306	Oct. 2001	Missing

C.2 REPUMP STATION CORRECTIONS

Table C-3 summarizes the pump stations that were removed from the re-pump databases.

Table C-3 Re-Pump Station Corrections

Re-Pump Station	Upstream Pump Station	Modification
8	156	Corrected two database tables to show this station does not re-pump flow
27	113 114	Corrected two database tables to show this station does not re-pump flow

Re-Pump Station	Upstream Pump Station	Modification		
55	20	Corrected two database tables to show this station does not re-pump flow		
58	57	Corrected two database tables to show this station does not re-pump flow		
308	309	Corrected two database tables to show this station does not re-pump flow		
318	350 420 472 473	Corrected two database tables to show this station does not re-pump flow		
326	325	Corrected two database tables to show this station does not re-pump flow		
366	363	Corrected two database tables to show this station does not re-pump flow		
410	409	Corrected two database tables to show this station does not re-pump flow		
335	434	Corrected two database tables to show this station does not repump flow from pump station 434. This station remains a re-pump station as it pumps flow from pump station 336		
491	493	Corrected two database tables to show this station does not re-pump flow		
618	619	Corrected two database tables to show this station does not re-pump flow		
704	702 734	Corrected two database tables to show this station does not re-pump flow		
713	714	Corrected two database tables to show this station does not re-pump flow		
760	753	Corrected two database tables to show this station does not re-pump flow		
793	791 792	Corrected two database tables to show this station does not re-pump flow		
801	788	Corrected two database tables to show this station does not re-pun flow		
815	505 816 817	Corrected two database tables to show this station does not re-pump flow		
830	839	Corrected two database tables to show this station does not re-pump flow		
835	836	Corrected two database tables to show this station does not re-pump		

Re-Pump Station	Upstream Pump Station	Modification	
		flow	
852	849	Corrected two database tables to show this station does not re-pump flow	
857	859	Corrected two database tables to show this station does not re-pump flow	
1008	1034	Corrected two database tables to show this station does not re-pump flow	
1054	1055 1056 1057	Corrected two database tables to show this station does not re-pump flow	
1061	1062	Corrected two database tables to show this station does not re-pump flow	
1071	1070	Corrected two database tables to show this station does not re-pump flow	

Table C-4 summarizes additional pump stations that may need to be removed from the database.

Table C-4
Re-Pump Stations that should be Confirmed

Re-Pump Station	Upstream Pump Station	Modification
14	118	Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables.
33	32 34	Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables.
48	37 38 84	Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables.
112	74	Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables.
130	132	Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables.
310	312 314	Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables.
383	384	Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables.

Re-Pump Station	Upstream Pump Station	Modification	
392	393	Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables.	
408	407	Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables.	
701	744	Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables.	
844	845 847 886	Confirm if pump station 844 is re-pumping flow from pump station 886 and if necessary, correct Upstream PS List and tblUpstreamPaths tables.	
1055	1056 1057	Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables.	
1056	1057	Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables.	
1063	1067	Confirm and if necessary, correct Upstream PS List and tblUpstreamPaths tables.	



APPENDIX D FIRST PAGES OF REPORTS



PUMP STATION BASIN CHARACTERISTICS

Basin Number	1		
Single Speed:	No	Cycles during 9/01 Storm Event:	Y
Re-Pump Station:	Yes	Cycles during 10/00 Storm Event:	Y

ADDRESS: 390 NW N RIVER DR

Pump Station Area Zoning:

Estimated Lateral Age:

North	East	Wellfield
Central or	or	Protection
South	West	Area
С	East	No

Basin Footage	Number of	Number of	Number of
(lf)	Segments	Manholes	Laterals
526,013	2,501	2,501	12,722

Date of last repair: 5/4/2002 Date of Last SSES:

Pump Station Basin Characteristics

Basin No.	Single Speed	Re-Pump Station	Cycles 10/00 Storm	Cycles 9/02 Storm	Address	Area Zoning	Estimated Lateral Age	North Central or South	East or West	Wellfield Protection Area	Basin Footage (If)	Number of Segments	Number of Laterals	Number of Manholes	Last Repair	Last SSES
1	No	Yes	Y	Y	390 NW N RIVER DR			С	East	No	526,013	2,501	12,722	2,501	5/4/2002	
2	No	Yes	N	N	925 NE BISCAYNE BLVD			С	West	No	470,910	2,194	11,105	2,194	1/1/2002	7/17/1997
4	Yes	No	N	N	65 SE 25 RD (BRICKELL AVE & SE 25 RD)			С	West	No	27,368	118	394	118	11/12/2001	
5	Yes	No	N	N	740 NE 55 TERR			N	East	No	35,186	150	578	150	1/6/2002	
6	Yes	Yes	N	N	500 NE 77 ST			N	West	No	54,414	244	1,172	244	12/26/2000	8/13/1997
7	Yes	No	N	N	621 NW 14 ST			С	West	No	22,446	110	382	110	9/11/2000	6/30/1997
8	No	No	Y	Y	1109 SE BRICKELL AVE			С	East	No	28,188	133	393	133	1/1/2002	4/30/1997
9	No	Yes	Y	Y	SW 22ND AVE & 26 LANE			С	West	No	140,257	601	158	601	4/19/2002	
10	Yes	Yes	N	N	1055 NW 23 AVE			С	West	No	62,924	265		265	4/24/2002	
11	Yes	No	N	N	3668 SW 28 ST (DOUGLAS PARK)	Multi-Family / Government	1956	С	West	No	101,322	420	2,492	420	12/27/2000	
14	No	Yes	N	N	8340 NW 54 ST			С	West	No	32,039	107	244	107	7/6/2001	8/19/1997
16	Yes	Yes	N	N	2190 SW 19 ST			С	West	No	143,430	576	222	576	4/16/2002	

PUMP STATIONS THAT CYCLED DURING THE SEPTEMBER 27-29, 2001 STORM

Pump Station Number	Pump Station Number	Pump Station Number
1	90	195
2	95	203
8	96	218
9	98	221
11	100	222
27	107	224
28	109	226
32	112	230
35	115	305
37	116	308
42	117	310
44	118	312
45	126	313
48	127	315
49	143	317
52	146	319
58	149	320
59	151	321
60	154	322
63	162	323
64	168	324
67	173	326
68	180	327
70	181	329
75	186	330
80	191	331
82	192	332
84	194	333

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PUMP STATIONS THAT CYCLED DURING THE OCTOBER 3, 2000 STORM

399 400 405	635 660
	660
405	
100	666
417	667
423	669
424	683
434	685
468	704
474	706
480	728
489	820
490	879
497	940
498	952
501	974
510	975
531	1004
535	1005
553	1014
563	1023
568	1031
570	1037
578	1072
582	1078
585	1080
593	
601	
615	
	417 423 424 434 468 474 480 489 490 497 498 501 510 531 535 553 563 568 570 578 582 585 593 601

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MULTI-SPEED PUMP STATIONS

Pump Station Number	Pump Station Number	Pump Station Number
1	347	666
2	348	667
8	414	668
9	415	669
14	416	683
19	417	685
26	418	691
27	421	692
49	422	704
55	423	709
101	424	728
107	425	742
109	426	755
112	428	761
115	429	1007
117	446	1072
121	501	1073
145	510	1310
177	516	
182	517	
187	522	
192	535	
300	536	
301	553	
306	559	
307	563	
318	568	
345	572	
346	601	

PUMP STATIONS WITH RECORDS IN THE RDII DATABASE BUT NO RECORDS IN BASIN INVENTORY

Pump Station Number	Pump Station Number	Pump Station Number
23	692	
178	721	
182	731	
187	746	
300	756	
306	788	
307	1073	
345	1209	
346	1310	
347	1316	
348	1317	
388		
416		
418		
421		
422		
425		
426		
469		
522		
536		
557		
558		
559		
570		
605		
606		
691		

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Pump Station Night Flows

Basin Number	Cycles 10/00 Rain	Cycles 9/01 Rain	Night Flow Dry 2001	Night Flow Wet 2001	Night Flow Dry 2002	Night Flow Wet 2002	dia-in	GPDIM
1	Y	Y	0	5			1,627	
2	N	Y	5	7	5,558	17,000	1,115	11,314
4	N	N	1	1	217	244	66	4,982
5	N	N	8	2	223	149	63	3,309
6	N	N	4	8	243	1,000	100	11,958
7	N	N	0	55	26	151	42	6,039
8	Y	Y	1	2		222	61	5,633
9	Y	Y	51	50			263	1,934
10	N	N	3	0	40	444	113	2,615
11	N	Y	0	0	135	275	210	1,335
14	N	N	7	1			53	6,345
16	N	N	9	0	286	1,178	249	1,846
17	N	N	141	74	46	92	44	2,173
18	N	N	0	3	247		177	2,600
19	N	N	6	13			24	
20	N	N	26	38	83		16	7,429
21	N	N	38	30	0	0	39	128
22	N	N	436	655	78	155	29	6,207
23	N	N						
26	N	N	120	43	533	300	33	29,142
27	Y	Y	5	44		600	25	38,467
28	N	Y	0	20	41	34	5	10,428

PUMP STATIONS THAT DID NOT CYCLE DURING THE OCTOBER 3, 2000 AND SEPTEMBER 27-29, 2001 STORMS

Pump Station Number	Pump Station Number	Pump Station Number
4	57	103
5	61	104
6	62	105
7	65	106
10	66	108
14	69	110
16	71	111
17	72	113
18	74	114
19	76	119
20	77	120
21	78	121
22	79	122
23	81	123
26	83	124
29	85	125
33	86	128
34	87	129
38	88	130
41	89	131
46	91	132
47	92	133
50	93	134
51	94	135
53	97	136
54	99	137
55	101	138
56	102	139

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REPUMP STATIONS

Pump Station Number	Pump Station Number	Pump Station Number
1	333	613
2	335	626
6	345	629
9	371	637
10	383	642
14	392	653
16	399	655
19	403	678
33	408	683
48	414	685
54	415	692
62	416	698
68	417	701
78	421	703
79	422	709
80	423	716
83	424	718
102	425	719
112	426	725
117	448	728
125	449	731
130	450	735
177	452	752
187	454	755
190	516	757
300	517	761
301	522	762
310	571	765
311	600	772

Upstream Paths for Each Pump Station

Plant	Upstream 1	Upstream 2	Upstream 3	Upstream 4	Upstream 5
CDWWTP	0001				
CDWWTP	0001	0004			
CDWWTP	0001	0007			
CDWWTP	0001	0009			
CDWWTP	0001	0009	0065		
CDWWTP	0001	0009	0066		
CDWWTP	0001	0009	0067		
CDWWTP	0001	0009	0068		
CDWWTP	0001	0009	0068	0053	
CDWWTP	0001	0010			
CDWWTP	0001	0010	0069		
CDWWTP	0001	0010	0071		
CDWWTP	0001	0011			
CDWWTP	0001	0016			
CDWWTP	0001	0016	0033		
CDWWTP	0001	0016	0033	0032	
CDWWTP	0001	0016	0033	0034	
CDWWTP	0001	0017			
CDWWTP	0001	0018			
CDWWTP	0001	0045			
CDWWTP	0001	0050			
CDWWTP	0001	0054			
CDWWTP	0001	0054	0072		
CDWWTP	0001	0054	0076		
CDWWTP	0001	0054	0085		
CDWWTP	0001	0055			
CDWWTP	0001	0055			
CDWWTP	0001	0056			
CDWWTP	0001	0059			

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Appendix C

Basin Storm Analysis

> Storm Event





Appendix D

CLIP Basin Hydrographs





Appendix E

Document Control Filing System Index



CLIP - Document Control

Filing System Index

May 22, 2006

G - General File RED Hanging Folders

G1000	CLIP Organization
G1001	Staffing
G1002	Protocols / Policies and Procedures
G1002.1	Hazen and Sawyer Corporate Library Policies and Procedures
G1002.2	Document Control
G1002.3	Articles/Conference Papers
G1002.4	Construction Policies
G1002.5	CLIP Video Review Procedures
G1002.6	Hazen and Sawyer Document Standards Manual
G1003	Quality Management
G1003.1	Management
G1004	Meetings
G1004.1	Monthly Meeting
G1004.2	Weekly Construction Meeting (Reminders)
G1004.3	EPA Meetings
G1004.3.1	December 8, 2004
G1004.3.2	March 24, 2005
G1004.3.3	March 20-24, 2006
G1005	Correspondence
G1005.1	General Correspondence
G1100	Office Operations
G1101	Budget
G1101.1	Sub consultant Participation
G1101.2	Cash Flow Analysis
G1102	Correspondence
G1110	CLIP Program Sub consultants
G1110	Hazen and Sawyer Correspondence
G1110.1A	Hazen and Sawyer Agreement
G1110.2	Earth Tech Correspondence
G1110.2A	Earth Tech Agreement
G1110.2B	Earth Tech Certificate of Insurance
G1110.2C	Earth Tech Invoices
G1110.3	San Martin & Associates Correspondence

G1110.3A	San Martin & Associates Agreement
G1110.3B	San Martin & Associates Certificate of Insurance
G1110.3C	San Martin & Associates Invoices
G1110.4	Cardozo Correspondence
G1110.4A	Cardozo Agreement
G1110.4B	Cardozo Certificate of Insurance
G1110.4C	Cardozo Invoices
G1110.5	Civil Cad Correspondence
G1110.5A	Civil Cad Agreement
G1110.5B	Civil Cad Certificate of Insurance
G1110.5C	Civil Cad Invoices
G1120	Administration
G1120.1	Parking Issues
G1120.2	Personnel
G1120.3	Program Invoices
G1120.4	Employee Time Cards
G2000	Consent Decree (EPA/DEP/DERM/VSC)
G2001	EPA Presentations
G2001.1	December 8, 2004
G2001.2	March 24, 2005
G2001.3	March 20-24, 2006
G2002	EPA Reports
G2003	EPA Program Extension
G2004	EPA Reporting Requirements – Meeting Minutes
G2005	EPA Grants
G2006	DEP
G2007	DERM Meetings
G2007.1	DERM - Meeting Minutes
	<u> </u>
G2008	DERM
G2008.1	Enforcement of Private Laterals Defects
G2009	VSC Presentation
G2009.1	June 30, 2005
G2010	VSC Reports
G2010	VSC Reports
G4000	Basic Agreement (Program)
G4001	Basic Agreement Correspondence
G4001.1	Basic Agreement Addendums
G4002	Notice to Proceed
S. = 0.0 f	
G5000	Other Reports
G5000.1	Monthly Status Report
G5000.2	Summary of Progress Payment (by contract)
G5000.2	Outreach Program
	<u> </u>
G5000.3.1	Property Owners Letters Mailing Status Report
G5000.3.2	Private Property Access Report
G5000.4	Basin Selection Report
	-

G6000	Schedule Reports
G6001	CLIP Implementation Schedule
G6002	Schedule Correspondence
G6100	Database
G6101	CLIP Database
G6102	Private Property Owners Database
G6103	Hydrographs Database
G8000	Dade County Ordinances
G8001	Affirmative Action Plan - Ordinance 82-37
G8002	Bonding Provisions - Fla. Statutes 255.05
G8003	Certification of Wage Rates - Fla. Statutes 287.055
G8004	Conflict of Interest - Ordinance 72-82
G8005	Contract Bonding - Fla. Statutes 287.0935
G8006	Dade County Manhole Ordinance 83-3
G8007	Disclosure Affidavit - Dade Co. Ordinance - 90-133
G8008	Discrimination - Dade Co. Resolution #9601
G8009	Drug Free Work Place - Ordinance 92-91, 92.15
G8100	Program Forms
G8100.1	Letterhead
G8100.2	Memorandums
G8100.3	Faxes
G8100.4	Meeting Minutes/Agendas
G8100.5	Work Orders
G8100.5.1	Lateral Daily Inspection and Testing Report
G8100.5.2	Inspection and Testing Sanitary Sewer Laterals
G8100.5.3	Blank Property Owners Notification Letters
G8100.6	Other Forms
G8200	Program – MIS
G9000	General Correspondence
G9008	Community Outreach Program
G9008.1	First Tier Letters
G9008.2	Second Tier Letters
G9008.3	Field Obtained Access Letters
G9008.4	Tuberculated Private Lateral Letters (S-793/Repair)
G9008.4.1	Tuberculated Without Proof Letter
G9008.4.2	Private Failed Without Proof Letter (Only Pressure Record
G9008.5	Correspondence
G9009	Community Workforce Program/Target Urban/Empowerment Zones
G9010	Technical Specifications

G9100 G9100.1	Conflict Verification/Road Moratorium Conflict Verification Request (from MDWASD)
G9100.1 G9100.2	Public Works
G9100.2 G9100.3	Capital Improvement Construction Coordinator (CICC) / CLIP
G9100.3 G9100.4	City of Miami
G9100.4 G9100.5	DERM
G9100.5 G9100.6	FDOT
G9100.0 G9100.7	FEMA/DORM
G9100.7	TEMA/DORM
G10000	Program Cost
G10001	S-782 (Inspection)
G10001.1	Program Manager
G10001.2	MDWASD
G10001.3	ESG
G10002	S-793 (Repair)
G10002.1	Program Manager
G10002.2	MDWASD
G10002.3	Contractor (?)
E4000 E	
<u>E1000 Engi</u>	neering Orange Hanging Folders
E1001	New Technology Inspection/Demonstration Projects
E1001.1	Fell – 21 Technology
	Fell – 21 Technology
E1001.1 E1002	9, <u>1</u>
E1002	Fell – 21 Technology Design and Reports
	Fell – 21 Technology Design and Reports Hydrographs
E1002 E1003	Fell – 21 Technology Design and Reports
E1002 E1003 E1003.1	Fell – 21 Technology Design and Reports Hydrographs Correspondence/Meeting Rain Data
E1002 E1003 E1003.1 E1003.2	Fell – 21 Technology Design and Reports Hydrographs Correspondence/Meeting
E1002 E1003 E1003.1 E1003.2 E1003.3	Fell – 21 Technology Design and Reports Hydrographs Correspondence/Meeting Rain Data Flow and Span Data
E1002 E1003 E1003.1 E1003.2 E1003.3 E1003.4	Fell – 21 Technology Design and Reports Hydrographs Correspondence/Meeting Rain Data Flow and Span Data Two-Year Storm Event Groundwater Data
E1002 E1003 E1003.1 E1003.2 E1003.3 E1003.4 E1003.5	Fell – 21 Technology Design and Reports Hydrographs Correspondence/Meeting Rain Data Flow and Span Data Two-Year Storm Event
E1002 E1003 E1003.1 E1003.2 E1003.3 E1003.4 E1003.5 E1003.6 E1003.7	Fell – 21 Technology Design and Reports Hydrographs Correspondence/Meeting Rain Data Flow and Span Data Two-Year Storm Event Groundwater Data Hydrograph Report SCADA
E1002 E1003 E1003.1 E1003.2 E1003.3 E1003.4 E1003.5 E1003.6 E1003.7	Fell – 21 Technology Design and Reports Hydrographs Correspondence/Meeting Rain Data Flow and Span Data Two-Year Storm Event Groundwater Data Hydrograph Report SCADA Basins Selection
E1002 E1003 E1003.1 E1003.2 E1003.3 E1003.4 E1003.5 E1003.6 E1003.7	Fell – 21 Technology Design and Reports Hydrographs Correspondence/Meeting Rain Data Flow and Span Data Two-Year Storm Event Groundwater Data Hydrograph Report SCADA Basins Selection Peak Flow Analysis
E1002 E1003 E1003.1 E1003.2 E1003.3 E1003.4 E1003.5 E1003.6 E1003.7	Fell – 21 Technology Design and Reports Hydrographs Correspondence/Meeting Rain Data Flow and Span Data Two-Year Storm Event Groundwater Data Hydrograph Report SCADA Basins Selection
E1002 E1003 E1003.1 E1003.2 E1003.3 E1003.4 E1003.5 E1003.6 E1003.7	Fell – 21 Technology Design and Reports Hydrographs Correspondence/Meeting Rain Data Flow and Span Data Two-Year Storm Event Groundwater Data Hydrograph Report SCADA Basins Selection Peak Flow Analysis
E1002 E1003 E1003.1 E1003.2 E1003.3 E1003.4 E1003.5 E1003.6 E1003.7 E1004 E1004.1 E1004.2	Fell – 21 Technology Design and Reports Hydrographs Correspondence/Meeting Rain Data Flow and Span Data Two-Year Storm Event Groundwater Data Hydrograph Report SCADA Basins Selection Peak Flow Analysis Basin Selection
E1002 E1003 E1003.1 E1003.2 E1003.3 E1003.4 E1003.5 E1003.6 E1003.7 E1004 E1004.1 E1004.2 E1005 E1005.1	Fell – 21 Technology Design and Reports Hydrographs Correspondence/Meeting Rain Data Flow and Span Data Two-Year Storm Event Groundwater Data Hydrograph Report SCADA Basins Selection Peak Flow Analysis Basin Selection Protocols Section Liner Protocol
E1002 E1003 E1003.1 E1003.2 E1003.3 E1003.4 E1003.5 E1003.6 E1003.7 E1004 E1004.1 E1004.2 E1005 E1005.1	Fell – 21 Technology Design and Reports Hydrographs Correspondence/Meeting Rain Data Flow and Span Data Two-Year Storm Event Groundwater Data Hydrograph Report SCADA Basins Selection Peak Flow Analysis Basin Selection Protocols Section Liner Protocol Technical Presentations/Papers
E1002 E1003 E1003.1 E1003.2 E1003.3 E1003.4 E1003.5 E1003.6 E1003.7 E1004 E1004.1 E1004.2 E1005 E1005.1	Fell – 21 Technology Design and Reports Hydrographs Correspondence/Meeting Rain Data Flow and Span Data Two-Year Storm Event Groundwater Data Hydrograph Report SCADA Basins Selection Peak Flow Analysis Basin Selection Protocols Section Liner Protocol

E1007	Basin Analysis
E1007.1	Basin 35
E1007.1 E1007.2	Basin 47
E1007.2 E1007.3	Basin 58
E1007.4	Basin 70
E1007.5	Basin 80
E1007.6	Basin 82
E1007.7	Basin 116
E1007.8	Basin 118
E1007.9	Basin 126
E1007.10	Basin 154
E1007.11	Basin 162
E1007.12	Basin 191
E1007.13	Basin 194
E1007.14	Basin 195
E1007.15	Basin 203
E1007.16	Basin 336
E1007.17	Basin 350
E1007.18	Basin 355
E1007.19	Basin 358
E1007.20	Basin 364
E1007.20 E1007.21	Basin 378
E1007.21 E1007.22	Basin 380
E1007.22 E1007.23	Basin 405
E1007.23 E1007.24	Basin 410
E1007.24 E1007.25	Basin 479
E1007.25 E1007.26	Basin 484
E1007.20 E1007.27	Basin 509
E1007.27 E1007.28	Basin 524
E1007.28 E1007.29	Basin 525
	Basin 564
E1007.30	
E1007.31	Basin 577
E1007.32	Basin 603
E1007.33	Basin 608
E1007.34	Basin 615
E1007.35	Basin 681
E1007.36	Basin 708
E1007.37	Basin 722
E1007.38	Basin 729
E1007.39	Basin 753
E1007.40	Basin 763
E1007.41	Basin 790
E1007.42	Basin 802
E1007.43	Basin 803
E1007.44	Basin 813
E1007.45	Basin 823

E1007.46	Basin 828
E1007.47	Basin 829
E1007.48	Basin 851
E1007.49	Basin 880
E1007.50	Basin 885
E1007.51	Basin 1004
E1007.52	Basin 1031
E1007.53	Basin 1032
E1007.54	Basin 1033
E1007.55	Basin 1063

B-Bid Blue Hanging Folders B1000 PreBid and Bid Documentation/S-782 (Inspection) B1000.1 Contract Specifications & Preparations B1000.2 **Quantity Estimates Prebid Meeting** B1200 Advertisement of Bid B1300 B1301 Addenda B1302 Pre-Qualification B1400 Award Recommendation B1500 Notice of Award Notice to Proceed B1600 B1700 Repair Analysis B2000 Correspondence MDWASD Correspondence (Written by MDWASD) B2001 B2002 CLIP Correspondence (Written by PM) Contractor (Written by Contractor) B2003 Review Agencies B2004 B2005 Other Correspondence **B3000** PreBid and Bid Documentation/S-793 (Repair) Contract Specifications & Preparations B3000.1 **Quantity Estimates** B3000.2 **Prebid Meeting** B3200 B3300 Advertisement of Bid B3301 Addenda B3302 Pre-Qualification B3303 **Bid Tabulation** Award Recommendation B3400 Notice of Award B3500 B3600 Notice to Proceed B3700 Repair Analysis **B4000** Correspondence

B4001	MDWASD Correspondence (Written by MDWASD)
B4002	CLIP Correspondence (Written by PM)
B4003	Contractor (Written by Contractor)
B4004	Review Agencies
B4005	Other Correspondence

<u>C - CONTRACTS/CONSTRUCTION</u> <u>YELLOW Hanging Folders</u>

C1000	Contract Documents
C1000.1	Contract
C1000.2	S – 782 (Countywide Two-Year Contract for Inspection and Testing of Sanitary Sewer Laterals)
C1000.3	S – 793 (Countywide Two-Year Contract for
C1000.5	Removal/Replacement and Rehabilitation of Sanitary Sewer
	Laterals)
C1000.4	Hazen and Sawyer and Earth Tech Agreement
C1001	Executed Contracts
C1002	Contract Extension
C1003	Utility Permit
C1004	Bond
C2000	Correspondence
C2001	MDWASD Correspondence (Written by MDWASD)
C2002	CLIP Correspondence(Written by PM)
C2003	Contractor Correspondence (Written by Contractor)
C2500	DERM Notification Reports
C3000	Meeting Minutes
C3100	Pre-Construction Agenda & Meeting Minutes
C3200	Weekly Construction Meeting Minutes
C3300	Weekly Construction Agenda
C4000	Safety/Equipment/Services
C5000	Contractor
C5001	Contractor Organization
C5002	Public Works Permit
C5003	Complaints on Contractor
C5003.1	Complaint Log
C5004	Certificate of Insurance
C5004.1	Owners Protective Liability Insurance
C5004.2	Workers Compensation and Employers Liability
C5005	Technical Submittal
C5006	Shop Drawings
C5007.1	Shop Drawings Log
C5008	CD Received Log

C5100	Payment Application / Invoices
C5101	Estimates for Progress Payment
C5102	Change Orders
C5103	Authorization to Make Payment Under Contract Allowance Account
C5103.1	Authorization # 1
C5103.2	Authorization # 2
C5104	Invoices – General Procedures
C5104.01	Invoice Tracking Sheet
C5104.02	WOSR
C5104.1	Invoice # 1 $2/1/05 - 2/25/05$
C5104.2	Invoice # 2 $\frac{2}{26}/05 - \frac{3}{25}/05$
C5104.3	Invoice # 3 $3/26/05 - 4/25/05$
C5104.4	Invoice # 4 $\frac{4}{26}/05 - \frac{5}{25}/05$
C5104.5	Invoice # 5 $\frac{5}{26} = \frac{6}{25} = \frac{6}{25}$
C5104.6	Invoice # 6 $6/26/05 - 7/25/05$
C5104.7	Invoice # 7 $7/26/05 - 8/25/05$
C5104.8	Invoice # 8 $8/26/05 - 9/25/05$
C5104.9	Invoice # 9 $9/26/05 - 10/25/05$
C5104.10	Invoice # 10 10/26/05 – 11/25/05
C5104.11	Invoice # 11 11/26/05 – 12/25/05
C5104.12	Invoice # 12 12/26/05 – 1/25/06
C5104.13	Invoice # 13 1/26/06 – 2/25/06
C5104.14	Invoice # 13 2/26/06 – 3/25/06
C5105	Carragnandanaa
C3103	Correspondence
C5200	Change Requests
	Change Requests Clarification Requests/RFI
C 5200 C5201	Change Requests
C5200 C5201 C5202 C5300	Change Requests Clarification Requests/RFI Request for Change/Substitution Work Orders / Inspection and Testing
C5200 C5201 C5202 C5300 C5300.1	Change Requests Clarification Requests/RFI Request for Change/Substitution Work Orders / Inspection and Testing General Correspondence
C5200 C5201 C5202 C5300 C5300.1 C5301	Change Requests Clarification Requests/RFI Request for Change/Substitution Work Orders / Inspection and Testing General Correspondence Work Orders (MDWASD)
C5200 C5201 C5202 C5300 C5300.1 C5301 C5301.01	Change Requests Clarification Requests/RFI Request for Change/Substitution Work Orders / Inspection and Testing General Correspondence Work Orders (MDWASD) CLIP-CND Laterals #1 (6/8/05)
C5200 C5201 C5202 C5300 C5300.1 C5301.01 C5301.02	Change Requests Clarification Requests/RFI Request for Change/Substitution Work Orders / Inspection and Testing General Correspondence Work Orders (MDWASD) CLIP-CND Laterals #1 (6/8/05) CLIP-CND Laterals #2 (8/9/05)
C5200 C5201 C5202 C5300 C5300.1 C5301.01 C5301.02 C5301.1	Change Requests Clarification Requests/RFI Request for Change/Substitution Work Orders / Inspection and Testing General Correspondence Work Orders (MDWASD) CLIP-CND Laterals #1 (6/8/05) CLIP-CND Laterals # 2 (8/9/05) CLIP-O1 (Basin 829) / Hold
C5200 C5201 C5202 C5300 C5300.1 C5301.01 C5301.02 C5301.1 C5301.2	Change Requests Clarification Requests/RFI Request for Change/Substitution Work Orders / Inspection and Testing General Correspondence Work Orders (MDWASD) CLIP-CND Laterals #1 (6/8/05) CLIP-CND Laterals # 2 (8/9/05) CLIP-01 (Basin 829) / Hold CLIP-02 (Basin 823)
C5200 C5201 C5202 C5300 C5300.1 C5301.01 C5301.02 C5301.1 C5301.2 C5301.3	Change Requests Clarification Requests/RFI Request for Change/Substitution Work Orders / Inspection and Testing General Correspondence Work Orders (MDWASD) CLIP-CND Laterals #1 (6/8/05) CLIP-CND Laterals #2 (8/9/05) CLIP-01 (Basin 829) / Hold CLIP-02 (Basin 823) CLIP-03 (Basin 851)
C5200 C5201 C5202 C5300 C5300.1 C5301.01 C5301.02 C5301.1 C5301.2 C5301.3 C5301.4	Change Requests Clarification Requests/RFI Request for Change/Substitution Work Orders / Inspection and Testing General Correspondence Work Orders (MDWASD) CLIP-CND Laterals #1 (6/8/05) CLIP-CND Laterals # 2 (8/9/05) CLIP-01 (Basin 829) / Hold CLIP-02 (Basin 823) CLIP-03 (Basin 851) CLIP-04 (Basin 194)
C5200 C5201 C5202 C5300 C5300.1 C5301.01 C5301.02 C5301.1 C5301.2 C5301.3 C5301.4 C5301.5	Change Requests Clarification Requests/RFI Request for Change/Substitution Work Orders / Inspection and Testing General Correspondence Work Orders (MDWASD) CLIP-CND Laterals #1 (6/8/05) CLIP-CND Laterals # 2 (8/9/05) CLIP-01 (Basin 829) / Hold CLIP-02 (Basin 823) CLIP-03 (Basin 851) CLIP-04 (Basin 194) CLIP-05 (Basin 524)
C5200 C5201 C5202 C5300 C5300.1 C5301.01 C5301.02 C5301.1 C5301.2 C5301.3 C5301.4 C5301.5 C5301.6	Change Requests Clarification Requests/RFI Request for Change/Substitution Work Orders / Inspection and Testing General Correspondence Work Orders (MDWASD) CLIP-CND Laterals #1 (6/8/05) CLIP-CND Laterals # 2 (8/9/05) CLIP-01 (Basin 829) / Hold CLIP-02 (Basin 823) CLIP-03 (Basin 851) CLIP-04 (Basin 194) CLIP-05 (Basin 524) CLIP-06 (Basin 603)
C5200 C5201 C5202 C5300 C5300.1 C5301.01 C5301.02 C5301.1 C5301.2 C5301.3 C5301.4 C5301.5 C5301.6 C5301.7	Change Requests Clarification Requests/RFI Request for Change/Substitution Work Orders / Inspection and Testing General Correspondence Work Orders (MDWASD) CLIP-CND Laterals #1 (6/8/05) CLIP-CND Laterals # 2 (8/9/05) CLIP-01 (Basin 829) / Hold CLIP-02 (Basin 823) CLIP-03 (Basin 851) CLIP-04 (Basin 194) CLIP-05 (Basin 524) CLIP-06 (Basin 603) CLIP-07 (Basin 813)
C5200 C5201 C5202 C5300 C5300.1 C5301.01 C5301.02 C5301.1 C5301.2 C5301.3 C5301.4 C5301.5 C5301.6 C5301.7	Change Requests Clarification Requests/RFI Request for Change/Substitution Work Orders / Inspection and Testing General Correspondence Work Orders (MDWASD) CLIP-CND Laterals #1 (6/8/05) CLIP-CND Laterals #2 (8/9/05) CLIP-O1 (Basin 829) / Hold CLIP-02 (Basin 823) CLIP-03 (Basin 851) CLIP-04 (Basin 194) CLIP-05 (Basin 524) CLIP-06 (Basin 603) CLIP-07 (Basin 813) Work Order (ESG)
C5200 C5201 C5202 C5300 C5300.1 C5301.01 C5301.02 C5301.1 C5301.2 C5301.3 C5301.4 C5301.5 C5301.6 C5301.7 C5302 C5302.1	Change Requests Clarification Requests/RFI Request for Change/Substitution Work Orders / Inspection and Testing General Correspondence Work Orders (MDWASD) CLIP-CND Laterals #1 (6/8/05) CLIP-CND Laterals #2 (8/9/05) CLIP-O1 (Basin 829) / Hold CLIP-02 (Basin 823) CLIP-03 (Basin 851) CLIP-04 (Basin 194) CLIP-05 (Basin 524) CLIP-06 (Basin 603) CLIP-07 (Basin 813) Work Order (ESG) S782-01 (Basin 364)
C5200 C5201 C5202 C5300 C5300.1 C5301.01 C5301.02 C5301.1 C5301.2 C5301.3 C5301.4 C5301.5 C5301.6 C5301.7 C5302 C5302.1	Change Requests Clarification Requests/RFI Request for Change/Substitution Work Orders / Inspection and Testing General Correspondence Work Orders (MDWASD) CLIP-CND Laterals #1 (6/8/05) CLIP-CND Laterals #2 (8/9/05) CLIP-01 (Basin 829) / Hold CLIP-02 (Basin 823) CLIP-03 (Basin 851) CLIP-04 (Basin 194) CLIP-05 (Basin 524) CLIP-06 (Basin 603) CLIP-07 (Basin 813) Work Order (ESG) S782-01 (Basin 364) S782-02 (Basin 358)
C5200 C5201 C5202 C5300 C5300.1 C5301.01 C5301.02 C5301.1 C5301.2 C5301.3 C5301.4 C5301.5 C5301.6 C5301.7 C5302 C5302.1	Change Requests Clarification Requests/RFI Request for Change/Substitution Work Orders / Inspection and Testing General Correspondence Work Orders (MDWASD) CLIP-CND Laterals #1 (6/8/05) CLIP-CND Laterals #2 (8/9/05) CLIP-O1 (Basin 829) / Hold CLIP-02 (Basin 823) CLIP-03 (Basin 851) CLIP-04 (Basin 194) CLIP-05 (Basin 524) CLIP-06 (Basin 603) CLIP-07 (Basin 813) Work Order (ESG) S782-01 (Basin 364)

S782-05 (Basin 1031)
S782-06 (Basin 564)
S782-07 (Basin 509)
S782-08 (Basin 608)
S782-09 (Basin 80)
S782-10 (Basin 70)
S782-11 (Basin 1063)
S782-12 (Basin 82)
S782-13 (Basin 195)
S782-14 (Basin 681)
S782-15 (Basin 729)
S782-16 (Basin 708)
S782-17 (Basin 603)
S782-18 (Basin 802)
S782-19 (Basin 828)
S782-20 (Basin 753)
S782-21 (Basin 722)
S782-22 (Basin 525)
S782-23 (Basin 880)
S782-24 (Basin 577)
S782-25 (Basin 1004)
S782-26 (Basin 885)

C5400 **Work Orders / Repairs and Replacement** General Correspondence C5400.1 Work Orders (MDWASD) C5401 MDLR-01 (Basin 823) C5401.1 C5401.2 MDLR-02 (Basin 1033) C5401.3 MDLR-03 (Basin 1063) C5401.4 MDLR-04 (Basin 564) C5401.5 MDLR-05 (Basin 708) C5401.6 MDLR-06 (Basin 681) C5401.7 MDLR-07 (Basin 70) C5401.8 MDLR-08 (Basin 80) C5401.9 MDLR-09 (Basin 82) C5401.10 MDLR-10 (Basin 509) C5401.11 MDLR-11 (Basin 608) MDLR-12 (Basin 823) C5401.12 C5401.13 MDLR-13 (Basin 851) C5401.14 MDLR-14 (Basin 1031) C5401.15 MDLR-15 (Basin 1063) C5401.16 MDLR-16 (Basin 47) C5401.17 MDLR-17 (Basin 194) MDGL Work Orders C5402 C5402.1 MDGL-01 (Basin 813)

C5500	Delays and Claims
C5501	Delays and Claims
C5(00	Donouts
C5600	Reports
C5601	Lateral Inspection and Summary Reports
C5602	Recommended Repairs Report
C5603	ESG's Revenue/Billed Report
C5604	CND Report
C6000	Schedule Reports
C6001	Contractor Schedule
C7000	Inancatous
	Inspectors
C7100	Daily Inspectors Reports (By month/year)
C7200	Inspector Meeting Minutes
C7300	Weekly Progress Reports (Meetings between Contractors & Construction)
C7400	Quality Control
C7500	Photographs
C7600	Meetings
C8000	Warranty Program
G8000.1	Warranty Program Correspondence
30000.1	warranty i regram correspondence



Appendix F

Typical Monthly Reports



Comprehensive Lateral Investigation Program (CLIP) Status Report April 2006

In addition to the administrative tasks associated with the Comprehensive Lateral Investigation Program (CLIP), the CLIP Team has performed the following specific tasks:

1. TAC Meeting

A monthly Peak Flow Technical Advisory Committee (TAC) Meeting, which includes the Comprehensive Lateral Investigation Program (CLIP) meeting, was held to coordinate all aspects of MDWASD Peak Flow Issues, including lateral pilot program issues.

Work Performed This Month

• Attended the April 7, 2006 TAC meeting.

2. Basin Selection

Montgomery Watson Harza (MWH) worked with the Peak Flow TAC to develop criteria for the selection of Program collection basins. Initially 32 basins were selected for the Program. Nine and then eleven additional basins were later added to the Program. This provided flexibility in the event that basins needed to be dropped because of a lack of wet weather response or other issues. A total of 52 basins are now included in the lateral pilot program. MWH provided a report describing the station selection process.

Work Performed This Month

• No work performed this month.

3. Basins Database

A Program database was developed to store the data related to the basins. This database includes the Basins Selection Criteria, Flow and Span per basin, Rainfall and Ground Water Level data, and program status. Different queries allow the Engineering Team to evaluate the hydrographs, perform peak flow analysis and review Program Status. Inspection and Testing Work Orders issuances, testing results, Repair Work Orders issuances, and repairs results are prepared and stored in the basins database.

Work Performed This Month

• Updated the Basin Analysis and Selection Report to select next Basins to inspect, test and repair.

4. <u>Hydrograph Development</u>

Hydrographs are used to document Program results and to estimate any resulting peak flow reductions. Hydrographs were developed for each of the 52 basins in the Program. They document station historical data over the last four years including station flows, groundwater levels and amount of rainfall. A major effort was required to select the closest appropriate groundwater and rainfall gauge location and obtain the data from United States Geological Survey (USGS) and the South Florida Water Management District (SFWMD). We now have a documented record of the "before" condition (before mainline repairs) during

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rain events. The hydrographs will be periodically updated as the Program continues. Also, requested additional gauges to be installed at five stations.

Work Performed This Month

- Updated hydrographs for the 55 basins (3 from previous programs).
- Updated CLIP Rainfall Graphs for all Rain Gauges.
- QA/QC SCADA data and Span for 13 basins.

5. <u>Initial Basin Inspection/Repairs (SSES)</u>

Department forces conducted SSES evaluations on each of the 52 basins in the Program. These evaluations consisted of 100% TV, smoke and manhole inspections. Main sewer defects were identified and scheduled for repairs. After repairs were completed in each basin, each manhole was sealed to eliminate a potential inflow source into the system. This work theoretically eliminated I/I sources in the main sewers and manholes and allowed the Program to focus on the individual laterals. Program personnel worked with the Department staff to schedule, monitor and report the inspection and repair work. To date, the Department has completed the SSES portion of the Program and all mainline repairs. Manholes in all 52 basins have been sealed.

Work Performed This Month

• No further work required.

6. <u>Lateral Inspection Contract</u>

Specifications for obtaining a contractor to inspect the laterals in the Program basins were developed under the previous I/I Reduction Program. Contract S-782 was bid. The low responsive bidder, EnviroWaste Services Group, Inc. (ESG), had a bid of \$3,894,838. The bids were reviewed and ESG was recommended for an award in the amount of \$3,300,000.

Work Performed This Month

• No further work required.

7. Outreach Program, including Letters to Property Owners

It was determined by the County Attorney's Office that the Department must obtain approval from each sewer lateral customer in order to inspect the private side of their lateral. The owners were identified for each of the laterals in the Program. A service to identify customers within the basin area was purchased. Letters requesting permission were prepared in English, Spanish, and Creole and then sent to each customer. The Department will only inspect the private side of the laterals when permission is granted from the customer.

Work Performed This Month

- The owners and mailing addresses were identified for 9,202 customers. Letters have been distributed to all identified property owners (9,202). The following are the responses received to date: 6,311 (68.58%) YESs, and 214 (2.33%) NOs.
- Continued updating the Property Owners database.
- Continued handling property owner's complaints.

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8. <u>Identification of Work Force Program Areas</u>

Some Lateral Pilot Program repairs will be within the Miami-Dade Work Force Program areas and the contractor will be obligated to hire workers within the work area. The Work Force areas were matched with the collection basin areas and it was determined that a total of 13 basins were within Work Force Program areas. Since the contractor's work is investigative in nature, the County has ruled that the Work Force Program does not apply to the Inspection and Testing phase of this program.

Work Performed This Month

• No further work required.

9. Road Moratorium/Construction Conflict Areas

CLIP repair areas could conflict with scheduled or ongoing construction projects by other agencies. Often there is a construction moratorium in areas where previous construction projects have recently paved roads. The Department must coordinate their Program with these agencies to reduce construction conflicts. Master plans and construction schedules were received from the Florida DOT, County Public Works Department, Department of Environmental Resources Management, CICC/OCI, and FEMA/DORM. Each construction project was identified and plotted on Program basin maps. Letters were issued to each of the agencies with maps showing the conflict areas and every two months additional letters will be issued to update the agencies of the status of the Program.

Work Performed This Month

- Updated the "Monthly Conflict Verification Status Report".
- A total of 27 construction program conflicts were identified.
- Bi-monthly Conflict Notification Letters were not sent out to various agencies this month.

10. Work Order Issuance

A work order system was developed to identify the work area and define the work required from the contractor and MDWASD. Each of the laterals in the Program will have a unique work order. The contractor will be issued the work order, perform the test and the inspection and then sign-off on the work performed. Field data from the SSES program will be used to identify the laterals and specific inspection requirements. As work progresses in the field, the inspector may modify the work order if additional inspections and tests are required.

Work Performed This Month

- Updated the Evaluation Lateral Report.
- Prepared an automatic Lateral Inspection and Testing Analysis Report (CND).
- QA/QC Televised laterals.
- Continued to update database with completed work orders.
- QA/QC Completed Work Orders updates.

11. Inspection and Testing Work

Work Orders are being issued to ESG's crews and MDWASD's crews to perform the inspections and testing of the sewer laterals.

Work Performed This Month

• The following tests were completed during the month.

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Basin	Laterals	Public						Private					
Dasin	Inspected	Pass	Fail		CND		Pass		Fail		CND		
722 (ESG)	39	7	18%	19	49%	11	28%	6	15%	8	21%	25	64%
880 (ESG)	214	204	95%	4	2%	6	3%	170	79%			44	21%
577 (ESG)	30	30	100%					30	100%				

^{*}Difference due to "wye" connections

Basin	Laterals Inspected	Public Pass		Fail		CND		Privato Pass	è	Fail		CND	
813 (MDWASD)	26	5	19%	19	73%	2	8%	3	12%	3	12%	20	76%

 A total of seven complaints were handled. These complaints were mostly in regards to restoration and were documented in the CLIP's Complaints database and given to the Contractor for resolution.

12. Weekly Construction Meeting

Weekly Construction Meetings are held to coordinate and update the CLIP "Inspection and Testing" and Repairs" activities performed by MDWASD and ESG.

Work Performed This Month

- Prepared and attended the meetings of:
 - o April 3, 2006
 - o April 10, 2006
 - o April 17, 2006
 - o April 24, 2006

13. CLIP Report

A CLIP Report will be prepared to present program progress and findings up to date. This report will also be submitted to the EPA for review to satisfy grant requirement.

Work Performed This Month

• The Draft CLIP report is 80 % completed.

14. Undersized CIP Liner Review

The main sewer cured-in-place liner contractor, SOS Construction, notified the Department that several installed liners were below the minimum thickness required by the specifications. Liner samples were measured and 66 liners available for testing were undersized. Preliminary tapes of these liners were reviewed and 25 liners indicated that they might have structural issues. The samples for the 25 liners were sent to the test laboratory for analysis. Hazen and Sawyer completed a report which helped resolve the issue with the Contractor.

Work Performed This Month

• No further work required.

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15. Retardant Approval

The liner contractor, SOS construction, requested the use of an inhibitor during the liner installation process. Hazen and Sawyer was asked to review the request. A memorandum recommending against the case of an inhibitor was given to the Contractor.

Work Performed This Month

• No further work required.

16. Review of Liners Pin Holes

A total of 15 installed liners exhibited pinholes. Hazen and Sawyer was requested to review the tapes and make a recommendation. The 15 tapes were reviewed, and it was recommended that an additional thin liner be installed in the lines.

Work Performed This Month

• No further work required.

17. EPA Meeting

A meeting with EPA staff was set for December 8, 2004 in Atlanta. A special presentation was developed in order to show program progress during the first 10 months of the program, and that a one year extension would be needed due to lack of rain. EPA will consider request. A follow up meeting was held on March 24, 2005 at MDWASD Douglas facility.

Work Performed This Month for Presentation

- Prepared a presentation for the EPA meeting
- A meeting with EPA was held on March 24, 2006

18. ESG Invoice Processing

The CLIP Team reviews ESG's monthly invoice. A Contractor invoicing review and approval system has been developed. Also, the invoicing process has been closely coordinated with MDWASD's invoicing procedures to ensure accurate and expedited review of ESG's invoices.

Work Performed This Month

- Continued collecting and classifying Inspector's field pictures per Work Orders.
- Started to develop protocol to review Work Orders automatically.
- Invoice # 11:
 - o Informed ESG Invoice # 11 had been sent to accounts payable on April 12th, 2006.
 - o Invoice # 11 paid on April 28th, 2006.
- Invoice # 12:
 - o Informed ESG Invoice # 12 had been sent to accounts payable on April 12th, 2006.
 - o Invoice # 12 paid on April 28th, 2006.
- Invoice # 13:
 - o Submitted Invoice # 13 to MDWASD on April 7th, 2006.
 - o Invoice # 13 paid on April 28th, 2006.
- Invoice # 14:
 - o ESG resubmitted Invoice # 14 on April 13th, 2006.
 - o CLIP Team rejected Invoice # 14 on April 18th, 2006.

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- o ESG resubmitted Invoice # 14 on April 20th, 2006.
- o Submitted Invoice # 14 to MDWASD on April 28th, 2006.

19. Repair (Call) Identification

Video recordings/CD of line segments that fail pressure test are reviewed in-house and repair recommendations are made according to the repair technologies specified in the repair contract documents. Also, Lateral Inspection field reports and field data is reviewed by CLIP staff and repair calls are made for each lateral, both public and private segments.

Work Performed This Month

- Continued reviewing inspection field reports and made repair recommendations.
- Updated reversed setup information for basins 47, 70, 80, 82 and 577 for the repair contractor
- Updated the Lateral Repair database
- Design the Field Repair Information Report

20. Repair Specification

Specifications for the repair of the laterals were developed. The specifications provide for the unit pricing of the various repair procedure anticipated under the program.

Work Performed This Month

- Attended the February 21, 2006, pre-construction meeting.
- Addressed issues raised at the pre-construction meeting in conjunction with MDWASD specifications.

21. Public Lateral Repairs

Repair Work Orders are being issued to MDWASD repair crews to perform excavated point repairs and full service lateral replacement.

Work Performed This Month

- Prepared report to track the repairs of public laterals by MDWASD.
- The following are the repairs completed and pending to date:

Basin	Total Repairs	Completed	Pending	
823	89	64	25	
1033	26	22	4	
1063	33	28	5	
564	11	11	-	
708	100	20	80	
70	10	8	2	
80	23	18	5	
82	15	15		
509	33		33	
608	34	4	30	
681	11	11		

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Basin	Total Repairs	Completed	Pending	
47	39	17	22	
194	30		30	
729	4		4	
851	23	23		
1031	6	6		
Total	487	247	240	

22. Private Lateral Defects

During the course of lateral inspection and testing, various defects are observed in private laterals. Some defects are visible and can be documented via video and/or pictures (smoke testing). Other defects are not visible. For the CLIP program to be effective, these private defects need to be repaired by the property owners. A meeting was scheduled with DERM to discuss enforcement procedures. Letters were developed to notify the property owners of the test results.

Work Performed This Month

- Continued to identify private laterals with visible defects.
- MDWASD and DERM met on a weekly basis to coordinate and revise the enforcement protocols.
- The following three Private Sewer Lateral letters were prepared and signed by John Chorlog:
 - o Tuberculated Private Sewer Lateral without proof (no video or smoke testing). A typical picture of a tuberculated pipe will be included.
 - o Failed Private Sewer Lateral without proof (only pressure test record to be included).
 - o Tuberculated Private Sewer Lateral with owner's lateral picture.
- Currently approximately 250 of these letters are being prepared to be mailed out.

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Appendix G

Typical Program Reports



LATENT DEFECT SUMMARY REPORT CLIP Basin Summary

	CLIP Basii	n Summary	
Basin		Number of	
Number	Last Repair Completed Date	Repairs	Manholes Sealed Date
35	February 22, 2004	64	March 4, 2004
47	May 21, 2003	406	April 4, 2004
58	June 17, 2004	105	January 18, 2005
70	June 21, 2004	13	October 4, 2004
80	August 4, 2004	118	October 5, 2004
82	September 24, 2004	41	January 13, 2005
118	November 14, 2002	44	November 21, 2002
126	October 28, 2003	35	November 3, 2003
154	January 27, 2004	30	February 4, 2004
162	February 27, 2004	20	March 4, 2004
194	July 14, 2004	38	July 24, 2004
195	May 24, 2004	20	May 31, 2004
336	May 27, 2004	16	June 4, 2004
350	September 10, 2004	123	December 6, 2004
355	September 24, 2004	183	January 13, 2005
358	August 12, 2004	23	September 4, 2004
364	September 24, 2004	149	December 9, 2004
378	August 16, 2004	155	October 4, 2004
380	August 5, 2004	109	January 13, 2005
405	June 10, 2004	28	July 4, 2004
410	May 24, 2004	112	June 4, 2004
479	July 23, 2004	94	December 9, 2004
484	July 16, 2004	60	December 6, 2004
509	July 1, 2004	35	August 5, 2004
524	May 1, 2004	6	June 4, 2004
525	August 19, 2004	29	September 14, 2004
564	November 8, 2003	50	December 3, 2003
577	May 7, 2004	92	August 11, 2004
603	July 19, 2004	52	August 11, 2004
608	May 1, 2004	32	August 11, 2004
615	June 2, 2004	331	August 13, 2004
681	August 20, 2004	40	October 19, 2004
708	August 30, 2004	110	October 19, 2004
722	August 20, 2004	26	September 21, 2004
729	April 17, 2004	27	May 4, 2004
753	May 12, 2004	90	September 24, 2004
763	October 24, 2002	74	October 31, 2002
790	January 8, 2004	7	August 11, 2004
802	May 5, 2004	36	August 11, 2004
803	October 4, 2004	102	October 19, 2004
813	September 6, 2002	1	September 13, 2002
823	March 16, 2004	114	April 4, 2004
828	May 1, 2004	33	August 20, 2004
829	March 7, 2003	3	August 20, 2003
851	November 13, 2002	49	November 20, 2002
880	April 26, 2004	41	August 23, 2004
885	January 13, 2004	64	February 4, 2004
	November 13, 2003		December 3, 2003
1004		81	
1031	Televised on May 29, 2003	0	June 5, 2003
1032	November 26, 2003	52	December 3, 2003
1033	April 28, 2004	40	August 23, 2004
1063	July 13, 2004	56	August 24, 2004
	Total Repairs	3,659	

LATENT DEFECT SUMMARY REPORT CLIP Basin Summary

	CLIP Basii	n Summary	
Basin		Number of	
Number	Last Repair Completed Date	Repairs	Manholes Sealed Date
35	February 22, 2004	64	March 4, 2004
47	May 21, 2003	406	April 4, 2004
58	June 17, 2004	105	January 18, 2005
70	June 21, 2004	13	October 4, 2004
80	August 4, 2004	118	October 5, 2004
82	September 24, 2004	41	January 13, 2005
118	November 14, 2002	44	November 21, 2002
126	October 28, 2003	35	November 3, 2003
154	January 27, 2004	30	February 4, 2004
162	February 27, 2004	20	March 4, 2004
194	July 14, 2004	38	July 24, 2004
195	May 24, 2004	20	May 31, 2004
336	May 27, 2004	16	June 4, 2004
350	September 10, 2004	123	December 6, 2004
355	September 24, 2004	183	January 13, 2005
358	August 12, 2004	23	September 4, 2004
364	September 24, 2004	149	December 9, 2004
378	August 16, 2004	155	October 4, 2004
380	August 5, 2004	109	January 13, 2005
405	June 10, 2004	28	July 4, 2004
410	May 24, 2004	112	June 4, 2004
479	July 23, 2004	94	December 9, 2004
484	July 16, 2004	60	December 6, 2004
509	July 1, 2004	35	August 5, 2004
524	May 1, 2004	6	June 4, 2004
525	August 19, 2004	29	September 14, 2004
564	November 8, 2003	50	December 3, 2003
577	May 7, 2004	92	August 11, 2004
603	July 19, 2004	52	August 11, 2004
608	May 1, 2004	32	August 11, 2004
615	June 2, 2004	331	August 13, 2004
681	August 20, 2004	40	October 19, 2004
708	August 30, 2004	110	October 19, 2004
722	August 20, 2004	26	September 21, 2004
729	April 17, 2004	27	May 4, 2004
753	May 12, 2004	90	September 24, 2004
763	October 24, 2002	74	October 31, 2002
790	January 8, 2004	7	August 11, 2004
802	May 5, 2004	36	August 11, 2004
803	October 4, 2004	102	October 19, 2004
813	September 6, 2002	1	September 13, 2002
823	March 16, 2004	114	April 4, 2004
828	May 1, 2004	33	August 20, 2004
829	March 7, 2003	3	August 20, 2003
851	November 13, 2002	49	November 20, 2002
880	April 26, 2004	41	August 23, 2004
885	January 13, 2004	64	February 4, 2004
	November 13, 2003		December 3, 2003
1004		81	
1031	Televised on May 29, 2003	0	June 5, 2003
1032	November 26, 2003	52	December 3, 2003
1033	April 28, 2004	40	August 23, 2004
1063	July 13, 2004	56	August 24, 2004
	Total Repairs	3,659	

RAINFALL/GROUNDWATER GAUGE ASSIGNMENT REPORT



Miami-Dade Water and Sewer Department Comprehensive Lateral Investigation Program

Basin		nprenensive		elationsh		Full Data			
Number	Footage (ft)	Location	Rain	GWL	Flow	Rain	GWL	Flow	
823	9,930	CW	Р	Р	Р	G	G	G	
729	5,044	SW	G	G	G	G	G	G	
829	1,527	CW	P	P	P	G	G	G	
162	5,779	CW	G	G	G	G	G	G	
722	17,725	SW	G	G	G	G	G	G	
118	4,314	NW	G	Ğ	P	G	G	P	
763	5,594	CW	G	P	Ğ	G	G	Ğ	
194	10,570	NW	P	Ğ	G	G	G	G	
378	13,317	NW	G	P	G	G	G	G	
1031	4,725	SW	G	G	G	G	G	G	
753	7,175	CW	G	G	G	G	G	G	
813	1,579	CW	Р	Р	Р	G	G	G	
608	4,603	SW	G	Α	G	G	G	G	
364	16,101	NW	G	Р	G	G	G	Р	
82	4,906	CW	G	G	G	G	G	G	
1004	10,340	SE	G	G	Р	G	G	P	
1063	10,594	SE	G	G	G	G	G	G	
525	66,830	CW	G	P	G	G	G	G	
803	15,300	CW	G	Α	G	G	G	G	
47	13,648	NW	G	G	G	G	G	G	
790	1,554	CW	G	P	P	G	G	P	
802	5,335	CW	G	Р	G	G	G	G	
615	11,273	CW	G	G	G	G	G	Р	
336	3,572	NW	G	Р	G	G	Р	G	
358	1,614	NW	G	G	Р	G	G	G	
405	1,354	NW	G	G	G	G	G	G	
35	4,367	NW	G	G	G	G	G	G	
70	507	CW	G	G	G	G	G	G	
126	1,895	CW	G	G	G	G	G	G	
154	3,583	CW	G	Р	G	G	G	G	
195	8,650	NW	G	Р	G	G	G	G	
58	4,767	CE	G	G	G	G	G	G	
380	8,453	NW	Р	G	G	G	G	Р	
681	6,750	SW	G	G	G	G	G	G	
524	8,562	CW	Р	Р	Р	G	G	G	
410	8,907	NW	G	G	G	G	G	Р	
885	6,581	CW	G	G	G	G	G	G	
851	10,414	CW	G	G	Р	G	G	G	
509	10,595	CW	Р	Р	Р	G	G	G	
479	19,025	NW	G	G	G	G	G	G	
577	8,159	SE	G	G	G	G	G	G	
603	12,482	SE	Р	G	Р	G	G	G	
355	16,101	NW	G	Р	G	G	G	G	
484	116,896	NW	G	G	G	G	G	G	
1033	9,594	SE	G	G	G	G	G	G	
1032	8,075	SE	G	G	G	G	G	G	
880	14,253	CW	G	G	G	G	G	G	
350	19,167	NW	G	Р	G	G	G	G	
708	11,816	SE	G	G	G	G	G	G	
828	4,665	CW	Р	Р	Р	G	G	G	
564	7,143	SW	A	A	A	G	G	Р	
80	20,414	CW	G	G	G	G	G	Р	



QUALIFIED BASIN REPORT

MIAMI-DADE WATER AND SEWER DEPARTMENT COMPREHENSIVE LATERAL INVESTIGATION PROGRAM

								Max			
			City of		RDII	Average	Peaking	Rain	Max Rain	No of	Inspection
CAT	Basin	Location	Miami	Age	Signature	Flow	Factor	(inch)	Date	Laterals	Status
Α	47	NW	Yes		Yes	170	1.84	4.27	6/21/2005	453	Completed
Α	70	CW	Yes		No	3	2.67	4.27	6/21/2005	16	Completed
Α	80	CW	Yes		Yes	130	2.72	4.89	6/21/2005	379	Completed
Α	82	CW	Yes		Yes	7	3.71	4.18	8/26/2005	194	Completed
Α	194	NW	No	1963	Yes	30	3.57	4.89	6/21/2005	59	Completed
Α	195	NW	No	1968	Yes	30	2.37	4.89	6/21/2005	61	Completed
Α	509	CW	No	1989	Yes	125	0.98	5.83	9/28/2004	223	Completed
Α	524	CW	No	1983	Yes	28	3.25	7.71	8/26/2005	120	Completed
Α	525	CW	No		Yes	65	6.52	7.71	8/26/2005	628	Completed
Α	564	SW	No	1987	Yes	25	5.28	5.3	10/15/2004	183	Completed
Α	577	SE	No	1989	Yes	110	4.56	4.57	8/26/2005	280	Completed
Α	603	SE	No	1970	Yes	75	2.71	5.3	10/15/2004	56	Completed
Α	608	SW	No	1970	Yes	13	2.77	5.3	10/15/2004	91	Completed
Α	615	CW	No	1956	Yes	50	3.24	7.71	8/26/2005	281	To be issued
Α	681	SW	No	1985	Yes	5	93	7.71	8/26/2005	41	Completed
Α	708	SE	No	1958	Yes	15	5.8	4.57	8/26/2005	217	Completed
Α	722	SW	No	1972	Yes	8	9.38	9.65	8/26/2005	52	Completed
Α	729	SW	No	1970	Yes	15	4.27	9.65	8/26/2005	71	Completed
Α	753	CW	No	1963	Yes	25	5.32	4.89	6/21/2005	111	Completed
Α	802	CW	No	1961	Yes	16	17.69	9.65	8/26/2005	118	To be issued
Α	813	CW	No	1958	Yes	30	8.23	4.18	8/26/2005	12	Completed
Α	823	CW	No	1968	Yes	28	3.29	9.65	8/26/2005	154	Completed
Α	828	CW	No	1978	Yes	15	3.8	9.65	8/26/2005	80	Completed
Α	851	CW	No	1977	Yes	60	1.72	5.83	9/28/2004	258	Completed
Α	880	CW	No	1978	Yes	60	2.83	7.71	8/26/2005	270	Completed
Α	885	CW	No	1979	Yes	20	3.15	7.71	8/26/2005	101	To be issued
Α	1031	SW	No	1989	Yes	27	8.3	4.71	10/15/2004	106	Completed
Α	1033	SE	No	1990	Yes	50	1.74	5.39	10/15/2004	304	Completed
Α	1063	SE	No	1972	Yes	24	4.79	5.3	10/15/2004	155	Completed
Α	1004	SE	No	1953	Yes	55	2.18	5.93	10/15/2004	224	Ongoing

Total Basins: 30 Total: 5,298 26 Basins
Laterals Inspected (Including tested and unable to test): 4,436 Completed

Total Laterals To Be Inspected by June 30, 2006: 862

TV Inspection: 5/06 - 06/06 Inspection Rate @ 22 Laterals Per Day 8 Weeks (June 30, 2006)

Summary

Next Issuance-Qualified BasinsBasins Completed26Production RateBasins Issued/Ongoing1HighLowBasins Pending Issuance3

1 885 615

2 802* *(Newly paved private community, to be inspected last)





MIAMI-DADE WATER AND SEWER DEPARTMENT COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)

Basin Number	Footage (ft)	Location	Atlas Page	Comm. District	No. of Stacks	No. of Laterals	Comments / Field Observations	WASD Field Observations	Scale
35	4,367	NW	E9	3	2	98	of the clean-outs for this plaza are located in the rear paved alley. The rest of the system consists of 2 story apartment buildings with multiple units. FDOT permit required for opencut repairs.	Half of system serves shopping plaza on NE 79 St & 4Pl. Most of the clean-outs for this plaza are located in the rear paved alley. The rest of the system consists of 2 story apartment buildings with multiple units. FDOT permit required for open-cut repairs.	2
47	13,648	NW	E9	3	192	452	FDOT permit required for open-cut repairs	50/50 Mix of Single Family Homes and 2 Story Apt. Buildings	2
58	4,767	CE	E13	3	5	95		Single Family / With some Apt Bldgs.	2
70	507	CW	H13	5	3	23	FDOT permit required for open-cut repairs	Non Typical / Future Construction	2
80	20,414	CW	J13	5	184	379	FDOT permit required for open-cut repairs	Sigle Family Homes /49% Stacks	2
82	4,906	CW	J13	5	14	194		Single Family Homes	1
118	4,314	NW	P10	12	4	33		This system is 100% warehouses with no visible clean-outs. There is heavy traffic and long property line to building distances. FDOT permit required for open-cut repairs.	3
126	1,895	CW	S14	12	4	23	This system is 100% 2-story apartment buildings.	Apts and Retail Stores / Not Favorable	2
154	3,583	CW	P12	12	4	28	This system is located at NW 36 St and 79 Ave. This is a very heavy traffic/commercial area. Most of this station would have to be done at night during low traffic hours. Very long runs between the property line and buildings. Many 5+ story office buildings.	This system is 100% warehouses with no visible clean-outs. There is heavy traffic and long property line to building distances. FDOT permit required for open-cut repairs.	3
162	5,779	CW	P13	12	1	41		This system is 100% warehouses with no visible clean-outs. There is heavy traffic and long property line to building distances. FDOT permit required for open-cut repairs.	3
194	10,570	NW	N10	12	27	65	FDOT permit required for open-cut repairs	This system is 100% warehouses with no visible clean-outs. There is heavy traffic and long property line to building distances. FDOT permit required for open-cut repairs.	3
195	8,650	NW	N10	12	5	51	This system is 100% warehouses with no visible clean-outs. There is heavy traffic and long property line to building distances. FDOT permit required for open-cut repairs.	This system is 100% warehouses with no visible clean-outs. There is heavy traffic and long property line to building distances. FDOT permit required for open-cut repairs.	3
336	3,572	NW	M4	13	0	26	Hold	Warehouses / Not favorable	2
350	19,167	NW	E1	1	57	535		100% Apt and condos / Non Favorable	3
355	16,101	NW	L3	13	27	249	Hold, FDOT permit required for open-cut repairs	Single Family Homes	1
358	1,614	NW	K3	1	1	65	No visible clean-outs available, half the system is located in backyards.	Backyard / Not Favorable	2
364	16,101	NW	K1	1	30	314	FDOT permit required for open-cut repairs. FDOT Construction year '07-'08. To be given first priority.	50/50 Mix of Single Family Homes and 2 Story Apt. Buildings	1
378	13,317	NW	J3	1	32	238	FDOT permit required for open-cut repairs	100% Backyard / Big Basin / Non Favorable	3
380	8,453	NW	P3	13	5	192	Hold	PSN Not Favorable	3
405	1,354	NW	N2	13	2	21	Hold	3 Story Apt Bldgs. / Not Favorable	2
410	8,907	NW	N2	13	11	109	Hold	50/50 Mix of Single Family Homes and 2 Story Apt. Buildings	1





MIAMI-DADE WATER AND SEWER DEPARTMENT COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)

Basin Number	Footage (ft)	Location	Atlas Page	Comm. District	No. of Stacks	No. of Laterals	Comments / Field Observations	WASD Field Observations	Scale	
479	19,025	NW	P2	13	22	446	Hold	50/50 Mix of Single Family Homes and 2 Story Apt. Buildings	1	
484	37,685	NW	P4	13	29	915		Single Family Homes	1	
509	10,595	CW	S18	10	21	223	FDOT permit required for open-cut repairs	50/50 Mix of Single Family Townhomes and 3 Story Apt. Buildings		
524	8,562	CW	T19	10	6	120	Some clean-outs identified, 2-3 story office buildings. Best candidate of seven proposed basins. 4 block area with 100% clean-outs located in paved driveways.	Mix of single family homes / New Construction / 3 Story office buildings	2	
525	20,488	CW	T20	10	1	628		Single Family Homes / Favorable	1	
564	7,143	SW	T27	9	98	183		54% Stacks / Construction	3	
577	8,159	SE	R28	8	26	280		50/50 Mix of Single Family Homes and 2 Story Apt. Buildings	2	
603	12,482	SE	S27	8	27	56	FDOT permit required for open-cut repairs	Cutler Ridge Mall / Not Favorable	3	
608	4,603	SW	T27	9	14	114	p p s s square s spa s s spa s	Single Family Homes / Area has new construction	2	
615	11.273	CW	S17	10	145	281		1005 Backyard / 52% Stacks / Not Favorable	3	
681	6.750	SW	U24	9	6	41	This system serves the Richmond Naval Air Station. It	This system serves the Richmond Naval Air Station. It contains	2	
	3,. 33						contains many empty lots with no visible clean-outs available. This area is not typical. We will end up excavating most of these laterals at the property line to test.	many empty lots with no visible clean-outs available. This area is not typical. We will end up excavating most of these laterals at the property line to test.		
708	11,816	SE	R27	8	66	233		Single Family Homes / Favorable	1	
722	17,725	SW	S24	9	3	52		Single Family Homes / Backyard, If need to do Backyard station this one favorable due to low % of stacks	2	
729	5,044	SW	Q22	8	37	71		Single Family Homes / Favorable	2	
753	7,175	CW	P16	10	48	125		Back Yard / 38% Stacks / Not Favorable	3	
763	5.594	CW	P19	7	5	61		100% Apt Bldgs	3	
790	1,554	CW	N19	7	1	12		Dadeland Mall / High domestic flow / Difficult	2	
802	5,335	CW	P20	8	7	118		Mostly 2 & 3 Story Apt Buildings	3	
803	15,300	CW	P20	8	10	411		Mixed Single Family and Townhomes with some Commercial.	2	
813	1,579	CW	Q15	10	7	12		2 Story Apt Bldgs.	3	
823	9,930	CW	R20	8	22	149		Single Family Homes / Favorable	1	
828	4,665	CW	R20	8	77	80		Single Family Homes / 96% Stacks	3	
829	1,527	CW	R19	8	1	44	FDOT permit required for open-cut repairs. FDOT construction year '05-'06. To be given first priority.	2 Story Apt Bldgs.	2	
851	10,414	CW	V18	10	19	258		Mostly Single Family Homes / Some 3 Story Apt Buildings	2	
880	14,253	CW	U21	8	53	270	FDOT permit required for open-cut repairs	Single Family Homes / Favorable	1	
885	6,581	CW	S22	8	18	101	This basin fits typical scenario. Single family homes and small	Single Family Homes / Favorable	1	
1004	10.340	SE	X32	8	39	224		Single Family Homes / Favorable, Labor Camp	1	
1031	4,725	SW	Z36	9	41	106		Single Family Homes / Favorable, Labor Camp	2	
1031	8,075	SE	T30	9	48	193		Single Family Homes / Favorable	1	
1032	9,594	SE	U30	8	42	311		Single Family Homes / Favorable	1	
1063	10,594	SE	Q26	8	37	157		Single Family Homes / Favorable	1	





Miami-Dade Water and Sewer Department Comprehensive Lateral Investigation Program

Basin Number	Footage (ft)	Location	Comments / WASD Field Observations	Difficulty	No. of Laterals	No. days	Weeks	No. of Stacks
126	1895	CW	This system is 100% 2-story apartment buildings. Apts. And Retail Stores / Not Favorable	2	23	2	0	4
509	10595	CW	50/50 Mix of Single Family Townhomes and 3 Story Apt. Buildings. FDOT permit required for open-cut repairs	2	223	19	4	21
524	8562	CW	Some clean-outs identified, 2-3 story office buildings. Best candidate of seven proposed basins. 4 block area with 100% clean-outs located in paved driveways. Mix of single family homes / New Construction / 3 Story office buildings	2	120	10	2	6
525	20488	CW	Single Family Homes / Favorable	1	628	52	10	1
615	11273	CW	1004 Backyard / 52% Stacks / Not Favorable	3	281	23	5	145
763	5594	CW	100% Apt Bldgs	3	61	5	1	5
813	1579	CW	1 Story Apt Bldgs.	3	12	1	0	7
823	9930	CW	Single Family Homes / Favorable	1	149	12	2	22
829	1527	CW	2 Story Apt Bldgs.FDOT permit required for open-cut repairs. FDOT construction year '05-'06. To be given first priority.	2	44	4	1	1
851	10414	CW	Mostly Single Family Homes / Some 3 Story Apt Buildings	2	258	22	4	19
880	14253	CW	Single Family Homes / Favorable. FDOT permit required for open-cut repairs	1	270	23	5	53
UBTOTA	L			3	2069	172	34	284
364	16101	NW	50/50 mix of single family homes and 2 story apt. buildings. FDOT permit required for open-cut repairs. FDOT Construction year '07-'08. To be given first priority.	1	314	26	5	30
410	8907	NW	Hold, 50/50 Mix of Single Family Homes and 2 Story Apt. Buildings	1	109	9	2	11
484	37685	NW	Hold, Basin too large. Single Family Homes	1	915	76	15	29
35	4367	NW	Half of system serves shopping plaza on NE 79 St & 4Pl. Most of the clean-outs for this plaza are located in the rear paved alley. The rest of the system consists of 2 story apartment buildings with multiple units.	2	98	8	2	2
47	13648	NW	50/50 mix of Single Family Homes and 2 Story Apt. Buildings.FDOT permit required for open-cut repairs	2	452	38	8	192
336	3572	NW	Warehouses / Not favorable. Hold	2	26	2	0	0
358	1614	NW	No visible clean-outs available, half the system is located in backyards. Not favorable	2	65	5	1	1
405	1354	NW	Hold, 3 Story Apt Bldgs. / Not Favorable	2	21	2	0	2
350	19167	NW	100% Apt and condos / Not Favorable.	3	535	45	9	57
378	13317	NW	100% Backyard / Big Basin / Non Favorable. FDOT permit required for open-cut repairs	3	238	20	4	32
UBTOTA	L				2773	231	46	356
577	8159	SE	50/50 Mix of Single Family Homes and 2 Story Apt. Buildings	2	280	23	5	26
603	12482	SE	Cutler Ridge Mall / Not Favorable. FDOT permit required for open-cut repairs	3	56	5	1	27
1033	9594	SE	Single Family Homes / Favorable	1	311	26	5	42
1063	10594	SE	Single Family Homes / Favorable	1	157	13	3	37
UBTOTA	L			3	804	67	13	132
564	7143	SW	54% Stacks / Construction	3	183	15	3	98
608	4603	SW	Single Family Homes / Area has new construction	2	114	10	2	14
729	5044	SW	Single Family Homes / Favorable	2	71	6	1	37
1031	4725	SW	Single Family Homes / Favorable. Labor Camp	2	106	9	2	41
	L				474	40	8	190

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LATERAL INSPECTION STATUS REPORT May 23, 2006



WATER AND SEWER COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)

MDWASD

	Sewer Lines								
Basin	Tested	Pass	Fail	CND	N/A	Pass	Fail	CND	Status
823	144	56	60	27	1	54	89	1	Completed
851	172	78	26	69	1	92	25	57	Completed
194	60	21	5	33	1	25	30	5	Completed
524	160	101	31	27	1	66	86	8	Completed
603	43	5	8	30		16	8	19	Completed
813	30	5	3	22		6	22	2	Completed
Total	609	266	133	208	4	253	260	92	

ENVIROWASTE SERVICES GROUP. INC

	Sewer Lines		Pri	vate			Public		
Basin	Tested	Pass	Fail	CND	N/A	Pass	Fail	CND	Status
364	328	106	30	157	35	181	127	20	Completed
358	48	14	15	19		23	19	6	Completed
47	349	52	58	209	30	85	232	32	Completed
1033	297	207	23	60	7	252	26	19	Completed
1031	109	76	3	28	2	90	9	10	Completed
564	195	139	8	48		182	12	1	Completed
608	75	35	6	33	1	27	37	11	Completed
509	204	115	5	84		140	35	29	Completed
1063	166	88	27	51		126	33	7	Completed
80	371	214	2	152	3	322	28	21	Completed
82	127	76	2	48	1	109	15	3	Completed
70	17		6	11		1	11	5	Completed
195	47	15	7	25		33	13	1	Completed
681	29	9	1	19		16	11	2	Completed
729	52	23		27	2	33	6	13	Completed
708	216	46	83	86	1	16	108	35	Completed
828	81	67	2	11	1	81			Completed
753	144	33	18	91	2	39	50	55	Completed
525	598	491	2	94	11	591	23	16	Completed
722	39	6	8	25		7	19	11	Completed
880	214	170		41	3	204	6	6	Completed
577	438	396	1	39	2	422	10	6	Completed
1004	181	30	164	7		29	149	3	Ongoing
Total	4,325	2,408	471	1,365	101	3,009	979	312	27

Grand 7 4,934

Legend

N/A: Access not granted.

CND: Could not do / tuberculated lines / could not access via cleanout / other

LATERAL INSPECTION SUMMARY REPORT May 23, 2006



MIAMI-DADE WATER AND SEWER DEPARTMENT COMPREHENSIVE LATERAL INSPECTION PROGRAM (CLIP)

			Public		Private					
Total Sewer Lines Tested		Pass	Fail	CND	Pass	Fail	CND	N/A		
4,934		3,262	1,239	404	2,674	604	1,573	105		
Percentage / Public*	4,905	67%	25%	8%						
Percentage / Private*	4,956				54%	12%	32%	2%		
Total Percentage		67%	25%	8%	54%	12%	32%	2%		

^{*} Difference due to wye connections

Legend

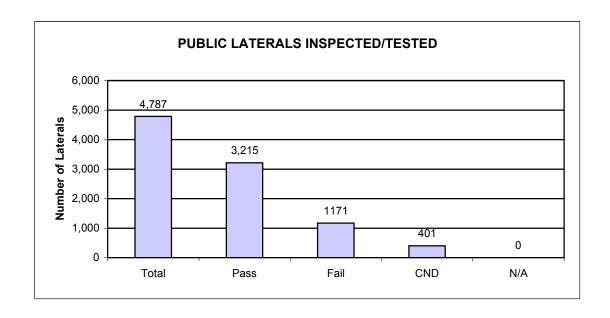
N/A: Access not granted.

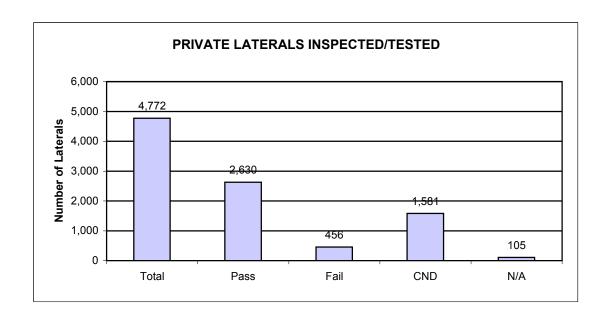
CND : See below

<u>Public</u>			<u>Private</u>		
Authorization pending	0	0.00%	Authorization pending	323	6.52%
Bend in Line	4	0.08%	Bend in Line	76	1.53%
Capped	18	0.37%	Capped	225	4.54%
Could not locate cleanout /	57	1.16%	Could not locate cleanout / service	84	1.69%
Could not push plug	18	0.37%	Could not push plug	170	3.43%
Deep manhole	3	0.06%	Deep manhole	6	0.12%
Did not do (DND)	15	0.31%	Driveway / Pavers	150	3.03%
Driveway / Pavers	96	1.96%	Heavy flow	4	0.08%
Heavy flow	4	0.08%	Long sweep	3	0.06%
Long sweep	0		No Access	127	2.56%
No Access (gate locked, parked car, dog in yard, etc.)	78	1.59%	No room to excavate	58	1.17%
No room to excavate	32	0.65%	Owner refused excavation	44	0.89%
Owner refused excavation	14	0.29%	Roots	5	0.10%
Roots	1	0.02%	Tuberculation	183	3.69%
Tuberculation	18	0.37%	Utility conflict	40	0.81%
Utility conflict	29	0.59%	Did not do (DND)	18	0.36%
Other	14	0.29%	Other	65	1.31%
	401	8.18%		1,581	31.90%



MIAMI-DADE WATER AND SEWER DEPARTMENT COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)







Miami-Dade Water and Sewer Department COMPREHENSIVE LATERAL INVESTIGATION PROGRAM **BASIN INSPECTION ANALYSIS REPORT**

WA	TER A	AND	SEWI								NSPECI								
Cat.	Basin	Loc.	City of Miami	Age:	Conflict Verification	RDII Sig	Peaking Factor 2001	Avg. Flow (gpm)	Peak Flow 2004/05 (gpm)		Peak Flow Date	Max Rain (inch)	Max Rain Date	# Stacks	# Laterals	Difficulty	Original Basins	Inspection Testing Status	Comments
	0813	CW		1958	FEMA/DORM CICC-PW	✓.	5.4	30	247	8.23	8/28/2005	4.18	8/26/2005	7	12	3	✓	Completed	CLIP
	0070	CW	✓		None		6	3	8	2.67	10/26/2004	4.27	6/21/2005	3	16	2		Completed	CLIP
	0828	CW		1978	None	V	3.1	15	57	3.80	8/27/2005	9.65	8/26/2005	77	80	1		Completed	CLIP
	0753	CW		1963	FEMA/DORM	V	4.8	25	133	5.32	6/21/2005	4.89	6/21/2005	48	111	3		Completed	CLIP
	0524	CW		1983	None	V	2.9	28	99	3.54	8/27/2005	7.71	8/26/2005	6	120	2	✓	Completed	CLIP.
	0823	CW		1968	CICC-PW	V	3.4	28	92	3.29	8/26/2005	9.65	8/26/2005	22	154	1	✓	Completed	CLIP
	0082	CW	✓		MDWASD	V	7.5	7	26	3.71	8/27/2005	4.18	8/26/2005	58	194	1		Completed	CLIP
	0509	CW		1989	FDOT	V	3.5	125	123	0.98	9/28/2004	5.83	9/28/2004	21	223	2	✓	Completed	CLIP
	0851	CW		1977	None	V	1.8	60	103	1.72	9/28/2004	5.83	9/28/2004	19	258	2	V	Completed	CLIP
	0880	CW		1978	PW	V	2.7	60	170	2.83	8/29/2005	7.71	8/26/2005	53	270	1	✓	Completed	CLIP
	0800	CW	✓		None	V	3	130	354	2.72	6/21/2005	4.89	6/21/2005	184	379	2		Completed	CLIP
	0525	CW			PW	V		65	424	6.52	8/28/2005	7.71	8/26/2005	1	628	1	V	Completed	CLIP
	0194	NW		1963	FEMA/DORM PW	V	8.6	30	107	3.57	6/21/2005	4.89	6/21/2005	27	59	3		Completed	CLIP.
	0195	NW		1968	FEMA/DORM	V	2.4	30	71	2.37	6/21/2005	4.89	6/21/2005	5	61	3		Completed	CLIP
	0047	NW	✓		PW	V		170	313	1.84	6/21/2005	4.27	6/21/2005	193	453	2	~	Completed	CLIP
	0603	SE		1970	None	V	2.7	75	203	2.71	10/15/2004	5.3	10/15/2004	27	56	3	✓	Completed	CLIP
	1063	SE		1972	PW	V	4	24	115	4.79	10/15/2004	5.3	10/15/2004	36	155	1	✓	Completed	CLIP
	0708	SE		1958	None	V	5.7	15	87	5.80	8/28/2005	4.57	8/26/2005	71	217	1		Completed	CLIP
	0577	SE		1989	None	V	3.1	110	502	4.56	8/26/2005	4.57	8/26/2005	26	280	2		Completed	CLIP
	1033	SE		1990	None	V	3.3	50	87	1.74	10/16/2004	5.39	10/15/2004	43	304	1	✓	Completed	CLIP
	0681	SW		1985	None	V	8.8	5	465	93.00	8/26/2005	7.71	8/26/2005	6	41	2		Completed	CLIP
	0722	SW		1972	FEMA/DORM	V	4	8	75	9.38	8/29/2005	9.65	8/26/2005	4	52	2		Completed	CLIP
	0729	SW		1970	CICC-PW	V	6.2	15	64	4.27	8/27/2005	9.65	8/26/2005	37	71	2	V	Completed	CLIP
	0608	SW		1970	FEMA/DORM CICC-PW	V	5.8	13	36	2.77	10/16/2004	5.3	10/15/2004	14	91	2	V	Completed	CLIP
	1031	SW		1989	FEMA/DORM	V	9.2	27	224	8.30	10/15/2004	4.71	10/15/2004	41	106	2	V	Completed	CLIP
	0564	SW		1987	None	V	5.4	25	132	5.28	10/15/2004	5.3	10/15/2004	98	183	3	V	Completed	CLIP
Α	0885	CW		1979	None	✓	2.7	20	63	3.15	8/28/2005	7.71	8/26/2005	18	101	1		Completed	CLIP
Α	0802	CW		1961	PW	V	5.9	16	283	17.69	8/27/2005	9.65	8/26/2005	7	118	3			CLIP/Hold/Pavement
Α	0615	CW		1956	FEMA/DORM PW FDOT	V		50	162	3.24	8/27/2005	7.71	8/26/2005	145	281	3	V	Issued	CLIP
Α	0803	CW		1960	CICC-PW	✓	2.6	100	114	1.14	10/15/2004	5.3	10/15/2004	117	411	2		Ongoing	CLIP
Α	0118	NW		1972	FEMA/DORM		1.8	25	144	5.76	5/16/2006	8.47	5/16/2006	4	33	3		Issued	CLIP
Α	1004	SE		1953	MDWASD	✓		55	120	2.18	10/19/2004	5.93	10/15/2004	39	224	1		Completed	CLIP
С	0058	CE		1946	None	✓	2.4	130	505	3.88	8/26/2005	2.19	8/26/2005	5	95	2			Pending Rain Event. Pumps to Biscayne Bay Interceptor
С	0336	NW		1983	None	~	11.7	25	99	3.96	6/24/2005	1.45	6/21/2005	0	26	2	✓		Pending Rain Event
С	0358	NW		1957	PW	~	7.3	20	40	2.00	6/24/2005	1.37	6/24/2005	1	67	2	✓	Completed	Pending Rain Event/Under Review (Hydrograph)
С	0035	NW	✓	1954	None	~	1.4	70	149	2.13	6/21/2005	3.15	6/21/2005	2	98	2	✓		Pending Rain Event
С	0410	NW		1980	None	V	6.3	30	90	3.00	6/24/2005	1.37	6/24/2005	11	109	1	✓		Pending Rain Event
С	0380	NW		1968	None		4	14	26	1.86	6/24/2005	1.37	6/24/2005	5	192	3			Pending Rain Event
С	0378	NW		1955	FEMA/DORM PW		3.4	80	175	2.19	9/11/2005	2.33	9/11/2005	32	237	3	V		Pending Rain Event
С	0355	NW		1960	None	V	4.9	63	180	2.86	6/24/2005	1.37	6/24/2005	27	249	1			Pending Rain Event
С	0364	NW		1971	FEMA/DORM FDOT	~	3.6	60	129	2.15	6/24/2005	1.37	6/24/2005	32	357	1	V	Completed	Pending Rain Event
С	0479	NW		1991	None	V	3.5	65	149	2.29	6/24/2005	2.01	6/24/2005	22	445	1			Pending Rain Event/No Signature
С	0350	NW		1979	None	~	27	110	220	2.00	9/11/2005	2.33	9/11/2005	60	535	3	V		Pending Rain Event
С	0484	NW			None			135	185	1.37	9/5/2004		9/5/2004	29	915	1	V		Pending Rain Event/Under Review (Hydrograph)
С	1032	SE		1989	None		3	58	71	1.22	8/28/2005	6.02	8/26/2005	48	193	1			O&M Issue
D	0790	CW		1961	PW		4.8	4	4	1.00	8/28/2005	9.65	8/26/2005	1	12	2			Lowest Priority
D	0126	CW		1086	None	~	2.7	35	122	3.49	6/23/2005	4.89	6/21/2005	4	23	2	V		CLIP. Corrected Latent Defects
D	0154	CW		1981	None		2.8	55	67	1.22	6/20/2005	4.89	6/21/2005	4	28	3			CLIP. Corrected Latent Defects
D	0162	CW		1995	FEMA/DORM PW		6.4	25	47	1.88	6/21/2005	4.89	6/21/2005	1	41	3			CLIP. Corrected Latent Defects
D	0829	CW		1968	FDOT		3.4	30	40	1.33	8/28/2005	9.65	8/26/2005	1	44	2	V		CLIP. Corrected Latent Defects
D	0763	CW		1972	CICC-PW		1.66	90	131	1.46	6/21/2005	2.49	6/21/2005	5	61	3	✓		CLIP. Corrected Latent Defects
D	0405	NW		1967	None	V	2.7	36	46	1.28	8/2/2004	3.52	8/1/2004	2	21	2	✓		CLIP. Corrected latent Defect
				1										<u> </u>	1	1		i.	

Legend/Summary

Location A Ready 32 Central East =1 B Ready but needs review 0 Original Basins 29 Central West =22 C Pending Rain Event Additional Basin 23 14 North West =16 TOTAL D No Signature/Low Peaking Factor/Flow extremely low 6 52 South East =7 TOTAL 52 South West =6

Difficulty

1 Favorable: Single Family Home

2 Less Favorable:: Townhomes / 2 Story Apt Bldg

3 Difficult: Apt and condos/ Backyard / Conflicts



MIAMI-DADE WATER AND SEWER DEPARTMENT COMPRENHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP) RECOMMENDED REPAIRS REPORT

	Date	Work		Property	A	Air Tests	5	Hydr	ostatic '	Tests	Smoke	e Tests	Lateral	Material	Surfac	е Туре	Repair
Basin	Inspected	Order	MH Depth	Access Allowed	Full System	Public	Private	Full System	Public	Private	Public	Private	Public	Private	CO1	CO2	Recommended
358	4/12/2005	2561	5.4	Yes		Fail	CND						Clay	Cast Iron			Dig and Replace
358	4/12/2005	2560	5.4	Yes		Fail	Fail						Clay	Cast Iron			Dig and Replace
358	4/12/2005	2559	5.4	Yes		Pass	Fail						Clay	Cast Iron	Grass		Dig and Replace
358	4/13/2005	2554	5.4	Yes	Fail	Fail	Fail						Clay	PVC	Grass		Dig and Replace
358	4/13/2005	2550	5.2	Pending		Fail	CND										Dig and Replace
358	4/13/2005	2551	5.2	Yes	Fail	CND	CND						Clay				Dig and Replace
358	4/13/2005	2553	5.4	Yes		Fail	Pass						Clay	PVC	Grass		Dig and Replace
358	4/13/2005	9588	5.4	Yes	Fail	Fail	Fail						Clay	PVC	Grass	Grass	Dig and Replace
358	4/13/2005	2555	5.4	Yes	Pass	Pass	Pass						Clay	PVC	Grass	Grass	Dig and Replace
358	4/13/2005	2557	5.4	Yes		Fail	Fail						Clay	Cast Iron		Grass	Dig and Replace
358	4/13/2005	2552	5.2	Pending		Fail	CND						Clay				Dig and Replace
358	4/14/2005	2514	1	Yes	Fail	Pass	Fail						Clay	Cast Iron	Grass		Dig and Replace
358	4/14/2005	2516	1	Pending		Fail	Fail						Clay	PVC	Grass		Dig and Replace
358	4/14/2005	2515	1	Yes	Pass	Pass	Pass						Clay	Cast Iron			Dig and Replace
358	4/14/2005	2520	1	Pending		Fail	CND						Clay	Cast Iron	Grass		Dig and Replace
358	4/14/2005	2522	1	Yes		Fail	Fail						Clay	Cast Iron	Grass		Dig and Replace
358	4/14/2005	2500	1	Yes		Pass	Fail						Clay	Cast Iron	Grass		Dig and Replace
358	4/14/2005	2512	1	Pending		Fail	CND						Clay	Cast Iron			Dig and Replace
358	4/14/2005	2558	6.8	Yes		Fail	CND						Clay	Cast Iron			
358	4/14/2005	2501	1	Yes	Pass	Pass	Pass						Clay	Cast Iron			Dig and Replace
358	4/14/2005	2506	1	Yes	Pass	Pass	Pass								Grass		Dig and Replace
358	4/15/2005	9587	4	Yes	Fail	Fail	Fail						Clay	PVC			Dig and Replace
358	4/15/2005	2546	4	Yes	Fail	Pass	Fail						Clay	Cast Iron			Dig and Replace
358	4/15/2005	2549	4	Yes	Pass	Pass	Pass						Clay	PVC	Grass	Grass	Dig and Replace
358	4/15/2005	2548	4	Pending		CND	CND										Dig and Replace
358	4/18/2005	2530	6.8	No		Fail	CND										
358	4/18/2005	2526	6.8	Yes		Fail	Pass						Clay	PVC			
358	4/18/2005	2527	6.8	Yes	Pass	Pass	Pass										
358	4/18/2005	2529	6.8	Yes	Fail	Pass	CND						Clay	Cast Iron			
358	4/18/2005	2531	6.8	Yes	Fail	Pass	CND						Clay	Cast Iron			
358	4/18/2005	2532	6.8	Yes	Pass	Pass	Pass						Clay	Cast Iron	Grass		
358	4/18/2005	2533	6.8	Yes	Pass	Pass	Pass						Clay	Cast Iron	Grass		

Thursday, June 22, 2006

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		Work		Property	A	Air Tests	1	Hydr	ostatic '	Tests	Smok	e Tests	Lateral	Material	Surfac	е Туре	Repair
Basin	Inspected	Order	MH Depth	Access Allowed	Full System		Private	Full System		Private	Public	Private	Public	Private	<i>CO1</i>	CO2	Recommended
358	4/18/2005	2534	6.8	Pending	Pass	Pass	Pass						Clay	Cast Iron			
358	4/18/2005	2535	6.8	Yes		CND	CND						Clay	Cast Iron			
358	4/18/2005	2528	6.8	Yes	Fail	Pass	CND						Clay	Cast Iron			
358	4/19/2005	2539	5.4	Yes	Fail	Fail	Pass						Cast Iron	PVC			Dig and Replace
358	4/19/2005	2540	5.4	Yes	Pass	Pass	Pass						Cast Iron	PVC		Grass	Dig and Replace
358	4/19/2005	2541	5.4	Yes	Pass	Pass	Pass						Cast Iron	PVC			Dig and Replace
358	4/19/2005	2538	5.4	Yes		CND	CND										Dig and Replace

Thursday, June 22, 2006

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REPAIR ISSUANCE REPORT



MIAMI-DADE WATER AND SEWER DEPARTMENT COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)

PUBLIC LATERALS ASSIGNED TO MDWASD FOR EXCAVATED POINT REPAIRS AND FULL SERVICE LATERAL REPLACEMENT

		Excavated	Pt. Repair /	Full Lateral				CIP Main Li	ne / Lateral	Connection	Repairs	
	Current	Replac	cement - MD	WASD	Cure	d-In-Place L	iners		Repair		Pending	
Basin	Repairs	Identified	Issued	Completed	Identified	Issued	Completed	Identified	Issued	Completed	Review	Status
47	224	138	138	105	86						0	Ongoing
70	10	10	10	8							0	Ongoing
80	27	27	27	18							0	Ongoing
82	15	15	15	15							0	Completed
194	30	30	30								0	Ongoing
195	13	8			5						0	To be issued
509	35	35	35	23							0	Ongoing
524	86										86	Under review
525	23	14	13	1	9						0	Ongoing
564	12	12	12	12							0	Completed
603	6	6	6								0	Ongoing
608	34	34	34	18							0	Ongoing
681	11	11	11	11							0	Completed
708	100	100	100	20							0	Ongoing
722	19	12	12		7						0	Ongoing
729	4	4	4								0	Ongoing
753	50			35	15						0	To be issued
813	19	19	19								0	Ongoing
823	89	89	89	74							0	Ongoing
828	0										0	N/A
851	23	23	23	23							0	Completed
880	6	6	6								0	Ongoing
1004	80										80	Insp. Ongoing
1031	6	6	6	6							0	Completed
1033	26	26	26	22							0	Ongoing
1063	33	33	33	33							0	Completed

26 981 658 649 424 122 166

6 Completed

^{*} Includes 60 Completed Grout Repairs

^{**} Includes 17 Grout Repairs



REPAIR STATUS REPORT May 23, 2006

MIAMI-DADE WATER AND SEWER DEPARTMENT COMPREHENSIVE LATERAL INVESTIGATION PROGRAM (CLIP)

			RE	GY		
Denie.	Commont Bounding	Court No.	Repair/Full Lateral Replacement Identified	Cured-In-Place Liners Identified	Line/Lateral Connection Repair Identified	Repairs Pending
Basin	Current Repairs	Cannot Do			identified	Review
47	224		138	86		0
70	10		10			0
80	27		27			0
82	15		15			0
194	30		30			0
195	13		8	5		0
509	35		35			0
524	86					86
525	23		14	9		0
564	12		12			0
603	6		6			0
608	34		34			0
681	11		11			0
708	100		100			0
722	19		12	7		0
729	4		4			0
753	50		35	15		0
813	19		19			0
823	89		89			0
828	0					0
851	23		23			0
880	6		6			0
1004	80					80
1031	6		6			0
1033	26		26			0
1063	33		33			0

26 981 693 122 166



Miami-Dade Water and Sewer Department COMPREHENSIVE LATERAL INVESTIGATION PROGRAM PROGRAM STATUS (June 2, 2006)

Basin	Rain Event 1 (2001)	Mainline SSES/ Repairs	Rain Event 2 (2-year Storm Event)	Qualified RDII	Lateral Inspection	Lateral Repair	Rain Event 3 (2-year Storm	Final Assessment
47	✓	✓	✓	Yes	Completed	Ongoing		
70	✓	✓	✓	Yes	Completed	Completed		
80	✓	✓	✓	Yes	Completed	Ongoing		
82	✓	✓	✓	Yes	Completed	Completed	✓	
118	✓	✓	✓	Yes	To Be Issued			
194	✓	✓	✓	Yes	Completed	Ongoing		
195	✓	✓	✓	Yes	Completed	To Be Issued		
509	✓	✓	✓	Yes	Completed	Ongoing		
524	✓	✓	✓	Yes	Completed	To Be Issued		
525	✓	✓	✓	Yes	Completed	Ongoing		
564	✓	✓	✓	Yes	Completed	Completed		
577	✓	✓	✓	Yes	Completed	To Be Issued		
603	✓	✓	✓	Yes	Completed	Ongoing		
608	✓	✓	✓	Yes	Completed	Ongoing		
615	✓	✓	✓	Yes	To Be Issued			
681	✓	✓	✓	Yes	Completed	Completed		
708	✓	✓	✓	Yes	Completed	Ongoing		
722	✓	✓	✓	Yes	Completed	Ongoing		
729	✓	✓	✓	Yes	Completed	Ongoing		
753	✓	✓	✓	Yes	Completed	To Be Issued		
802	✓	✓	✓	Yes	To Be Issued			
803	✓	✓	✓	Yes	Ongoing			
813	✓	✓	✓	Yes	Completed	Ongoing		
823	✓	✓	✓	Yes	Completed	Ongoing		
828	✓	✓	✓	Yes	Completed	Completed		
851	✓	✓	✓	Yes	Completed	Completed		
880	✓	✓	✓	Yes	Completed	Ongoing		
885	✓	✓	✓	Yes	Ongoing			
1004	✓	✓	✓	Yes	Completed	To Be Issued		
1031	✓	✓	✓	Yes	Completed	Completed		
1033	✓	✓	✓	Yes	Completed	Completed		
1063	✓	✓	✓	Yes	Completed	Completed		
126	✓	✓	✓	No	N/A	N/A		
154	✓	✓	✓	No	N/A	N/A		
162	✓	✓	✓	No	N/A	N/A		
763	✓	✓	✓	No	N/A	N/A		
790	✓	✓	✓	No	N/A	N/A		
829	✓	✓	✓	No	N/A	N/A		
Sub-To	otal 38	38	38	Yes: 32 C	Completed 27		1	1

Yes: 32 Completed 27 Completed 9
No: 6 Ongoing 2 Ongoing 13
To Be Issued 3 To Be Issued 5
N/A 6 N/A 6



Miami-Dade Water and Sewer Department COMPREHENSIVE LATERAL INVESTIGATION PROGRAM PROGRAM STATUS (June 2, 2006)

Basin	Rain Event 1 (2001)	Mainline SSES/ Repairs	Rain Event 2 (2-year Storm Event)	Qualified RDII	Lateral Inspection	Lateral Repair	Rain Event 3 (2-year Storm	Final Assessment
35	✓	✓	✓					
58	✓	✓	✓					
336	✓	✓						
350	✓	✓						
355	✓	✓						
358	✓	✓			Completed			
364	✓	✓			Completed			
378	✓	✓						
380	✓	✓						
405	✓	✓	✓					
410	✓	✓						
479	✓	✓	✓					
484	✓	✓						
1032	✓	✓						
Sub-Tota	al 14	14	4	No: 0	Completed 2 Ongoing 0 To Be Issued 0 N/A 0	Completed 2 Ongoing 0 To Be Issued 0 N/A 0		0
Total	52	52	42	No: 6	Completed 27 Ongoing 2 To be Issued 3 N/A 6	Completed 9 Ongoing 13 To Be Issued 5 N/A 6	3	1